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THESIS

**TRICARE VERSUS FEHBP:
A PILOT STUDY OF COMPARATIVE
INPATIENT COSTS IN REGION 10**

by

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June, 1997

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A PILOT STUDY OF COMPARATIVE
INPATIENT COSTS IN REGION 10**

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ABSTRACT

Approximately 3.5 billion dollars of the Defense Budget for Fiscal Year 1997 was allocated for the care of non-active duty beneficiaries. This thesis is a pilot study exploring one option to restructure the military beneficiary health system. Two methods of health care delivery are examined: traditional fee-for-service plans, and health maintenance organizations (HMO). The advantages, disadvantages, and cost implications associated with inpatient care, in TRICARE Region 10, under the TRICARE Program and the Federal Employees Health Benefits Program are explored, using some recent historical data. The FEHBP fee-for-service costs were found to be higher than TRICARE Standard costs. It is inferred that allowing non-active duty military beneficiaries to participate in the HMO option of the FEHBP reduces out-of-pocket inpatient cost to the enrollee, and maintains or improves access to and quality of care. Costs to the government for inpatient care are reduced. Four cases are examined, determining out-of-pocket enrollee cost as well as savings to the government. Lastly, a Health Care Demands and Cost Probability Model is developed; the model generalizes and is consistent with assumptions made for previous calculations, and could be adapted to determine outpatient costs as well. It allows government estimates of random variations in health care costs to be made.

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EXECUTIVE SUMMARY

This thesis is a pilot study exploring one option to restructure the military beneficiary health system. In 1993, the Department of Defense began the formal transition from the Civilian Health and Medical Program of the Uniformed Services (CHAMPUS), a fee-for-service program, to TRICARE, a managed care program intended to reduce costs and increase choice. The advantages, disadvantages, and cost implications associated with inpatient care under the TRICARE Program and the Federal Employees Health Benefits Program (FEHBP) are explored.

While the DoD is firmly behind TRICARE (the insurance program through which active duty dependents, retirees and their families, and survivors share the cost of health care received in a civilian setting) as the best means to secure health care benefits for eligible beneficiaries, there is some belief that allowing participation in the FEHBP (the insurance program open to federal employees, administered by the U.S. Office of Personnel Management) is preferable to participating in the TRICARE system. DoD's present position is that it is less costly for non-active duty beneficiaries to obtain healthcare under the TRICARE program than to initiate a "Medical Allowance" to underwrite an alternative such as FEHBP. This study focused on TRICARE Region 10, Northern

California. Frequency of demand for care and cost data were obtained.

Traditional fee-for-service plans in FEHBP were examined first. Out-of-pocket expense for the FEHBP enrollee for Region 10's most frequently occurring Diagnostic Related Groups (DRG) was calculated for the seven national FEHBP benefit plans, and compared to out-of-pocket costs under TRICARE Standard. Out-of-pocket inpatient costs under the FEHBP Health Maintenance Organizations (HMO) participating in Northern California were compared to like costs under TRICARE Prime. FEHBP fee-for-service costs were found to be higher than those of TRICARE Standard; FEHBP HMO inpatient costs were lower than those of TRICARE Prime.

Cost to the government was examined under four cases. Two cases were found to reduce out-of-pocket expense, and at the same time result in savings to the government.

A Health Care Demands and Cost Model was developed. The model allowed the relaxation of several assumptions necessary for calculations of the government cost. Although developed to determine inpatient costs, the model could be adapted to examine average outpatient costs as well.

I. INTRODUCTION

A. STATEMENT OF PROBLEM

The War Department Appropriations Bill enacted by the 48th Congress in 1885 provided "The Medical Officer of the Army and Contract Surgeon shall, when ever practical, attend the families of officers and soldiers free of charge." Later, the Cold War required a large military force; lifetime medical care was used as a recruitment and retention incentive. The Dependents' Medical Care Act (P.L. 84-569; June 7, 1956; 70 Stat.250) made space available medical care an entitlement for active duty dependents. Legislation enacted in 1956 allowed the defense department to contract with private sources to care for dependents of active duty members. This legislation paved the way for Congress to enact the Civilian Health and Medical Program of the Uniformed Services (CHAMPUS), which became effective in 1967. (Partridge, 1996)

In 1993, the Department of Defense (DoD) began the formal transition from CHAMPUS, a fee-for-service program, to TRICARE, a managed care program intended to reduce costs and increase choice. The goal is that TRICARE will be funded and operational nationwide by the end of 1997. "Post-cold war planning scenarios, efforts to reduce the overall size of the nation's military forces, federal budget-reduction

initiatives, and base closures and realignments have all heightened scrutiny of the size and makeup of DoD's health care system (GAO/HEHS-96-128, 1996)."

This thesis is a pilot study exploring one option to restructure the military beneficiary health system. The advantages, disadvantages, and cost implications associated with inpatient care under the TRICARE Program and the Federal Employees Health Benefits Program (FEHBP) are explored. Descriptive statistics and data analysis are used to examine the following questions: 1) Will allowing CHAMPUS eligible beneficiaries to enroll in a FEHBP health benefit plan increase their out-of-pocket expenses? If so, what are the likely increases? 2) Will patient access and quality of care be affected? 3) Is it cost effective to initiate a "Medical Allowance" option to provide active duty members, retirees and survivors with a stipend to obtain medical coverage for eligible beneficiaries through one of the FEHBP benefit plans? 4) Will the cost to the government increase or decrease, and to what likely level?

A limited amount of data has been found available to address these questions. Hence our results are tentative. A formal but simple mathematical model has been provided to support the present analysis and more intensive future analysis.

B. BACKGROUND

The President's Defense Budget for Fiscal Year 1997 allocated \$15.1 billion for the DoD medical budget. Of this amount, approximately \$9.6 billion is set aside for the Defense Health Program (DHP) to provide worldwide medical and dental support to the active duty military and other eligible beneficiaries—a population of 8.3 million. Of the \$9.6 billion set aside for the DHP, \$3.5 billion is included for the CHAMPUS and TRICARE Managed Care Support Contracts. CHAMPUS is the insurance program through which active duty dependents, retirees and their families, and survivors share the cost of health care received in a civilian setting. Active duty dependents, retirees and their families, and survivors will be referred to in this study as eligible beneficiaries.

While the DoD is firmly behind TRICARE as the best means to secure health care benefits for eligible beneficiaries, some members of family associations and associations of retired military members, service groups, and some elected officials have other preferences. They believe that allowing participation by eligible beneficiaries in the FEHBP is preferable to participating in the TRICARE system. DoD's present position is that it is less costly for non-active duty beneficiaries to obtain healthcare under the TRICARE program

than to initiate a "Medical Allowance" to underwrite an alternative such as FEHBP, as recommended by the Commission on Roles and Missions of the Armed Forces. (White, 1995) The medical allowance option would provide eligible beneficiaries with a stipend to obtain medical coverage through one of the FEHBP benefit plans. (There would be no change in the way active duty members receive medical care.)

Financial resources have become scarcer at a time when military members and their beneficiaries perceive their benefits to be shrinking. Nowhere is this truer than in the area of healthcare. No longer can a non-active duty beneficiary count on treatment in military treatment facilities (MTF), that is, on "free" care. More and more, treatment must be obtained in the civilian community, at a cost to the beneficiary. Thirty-five percent of the MTFs which provided services in 1987 will be closed by the end of 1997. During that same ten year period, the number of eligible beneficiaries will decrease by only nine percent. The beneficiary population has also changed over time. In the 1950s, retirees made up eight percent of the eligible beneficiaries; In 1997, they make up more than fifty percent (Joseph, 1997).

After installation support and central training, central medical is the third-largest of eight infrastructure

categories funded by the DoD. A decrease in infrastructure funding will allow DoD to pay for modernization of weapon systems. DoD projects that the DHP, which accounts for the majority of medical cost, will make up about six percent of the DoD total budget through at least fiscal year 2003 (GAO/NSIAD-97-83BR, 1997).

C. LITERATURE REVIEW

Beneficiary medical care has been of concern to the Commission on Roles and Missions of the Armed Forces. Several years ago the commission recommended expanding TRICARE to include a competitive civilian health care plan, such as the FEHBP. (White, 1995)

Voluntary enrollment in FEHBP by non-active duty beneficiaries, with the DoD responsible for the employer portion of premiums, was examined in a Congressional Budget Office report. (CBO, 1997) The economic conclusion was that the government's cost would be substantially less than any savings achieved by downsizing and restructuring military medicine.

The Congressional Budget Office paper, "Restructuring Military Medical Care", was prepared to respond to the House Committee on National Security. In the paper, DoD's ability to provide peacetime health care cost effectively is analyzed. Alternate ways of performing a wartime mission, and delivering

peacetime care to beneficiaries are also examined. Three alternatives involving FEHBP are offered. In the first option, the government pays about 72% of the average FEHBP premium. In the second option, the government's contribution is raised to 85% of the premium. Lastly, the case is examined when beneficiaries' premiums are set at the levels of TRICARE Prime. (CBO, 1995)

The detrimental effect of an FEHBP option on medical and military professional skills maintenance is addressed in a prepared statement before Congress by the Assistant Secretary of Defense for Health Affairs. His statement was that, the conversion to FEHBP would not satisfy medical readiness requirements, result in savings, or be willingly accepted by a significant number of beneficiaries. (Joseph, 1995)

The Military Coalition, made up of representatives of 28 military and veterans organizations, formed the Coalition's Health Alternative Reform Task Force to "conduct a thorough analysis of possible alternatives to the current military health care benefit provided to all uniformed services members and their families" (CHART, 1995). Its findings, published in September 1995, consider four alternatives, one of which was the Federal Employees Health Benefits Program. (CHART, 1995)

TRICARE Prime enrollment in Northern California (Region 10) was studied by Copley. He found that active duty family

members enrolling in Prime tend to choose a network provider, a civilian primary care manager. Enrolled retirees and their family members were more likely to choose a primary care provider at the MTF, possibly because they had already paid an enrollment premium, and did not want the additional out-of-pocket expense of copayments. (Copley, 1996)

Gross and Schaffer, in a 1989 study of consumer awareness of mortality data, found that the majority of consumers judged hospital quality through personal assessments: advice from a doctor, or from family and friends. Approximately 5% relied on objective ratings found in consumer reports or published death rate information. (Gross et al., 1989)

Over a ten-year period (years unstated), only 15% of FEHBP employees considered switching benefit plans, according to Blankenau. Of major concern is the ability to choose and retain providers. The article further points out that to the potential enrollee, the most important factors in a plan's cost are copayments, deductibles, and maximum out-of-pocket spending limits. (Blankenau, 1993)

D. THESIS METHODOLOGY

1. Selection of Population for Exploration

TRICARE Region 10, Northern California, was chosen as the focus of this pilot study for several reasons. The Lead Agent, located at Travis Air Force Base, is in close proximity

to the Naval Postgraduate School. Professional relationships have been formed with Lead Agent staff members, allowing for the sharing of data and other information. The analysis was limited to inpatient data as a first step in the TRICARE to FEHBP comparison.

2. Analysis Delineation

To accomplish this pilot study:

1. Cost and utilization data (FY 95 and FY 96) for TRICARE Region 10 was explored, to include government and patient cost shares.
2. Each FEHBP benefit plan was carefully examined, and levels of coverage were extracted and charted. Per-admission deductibles were noted. This data extraction forms the basis of the comparison process. The same data extraction was performed for the TRICARE options.
3. The stated level of coverage for the seven fee-for-service plans was used to estimate out-of-pocket expense for the top 100 Diagnosis Related Groups (DRG) in TRICARE Region 10. (Each plan may have a different out-of-pocket expense for a service.) The private insurance average billable cost, by DRG, for the state of California, formed the basis of the data calculation. (The Preferred Provider Option

available from some plans was not considered in this analysis due to the proprietary nature of each plan's discount agreements.) The out-of-pocket expense, to an enrollee, for the twelve HMOs available in northern California was determined for the top 100 DRGs. The top one hundred DRGs were determined by the frequency of admissions in TRICARE Region 10 during FY 96.

4. Out-of-pocket expenses under TRICARE Standard and Prime were computed.
5. FEHBP premiums are examined, tabulated, and graphed.
6. Enrollment totals for the HMO plans in the state of California are presented; national enrollment figures for the seven nation-wide fee-for-service plans are listed.
7. Customer satisfaction survey results are examined.
8. Conclusions are drawn based on data analysis. These are suggestive but are based on limited data availability.

3. Data Sources

Reports detailing CHAMPUS cost and utilization data, FS130-002 INPATIENT REPORT, have been obtained for FY 95 and FY 96 from the TRICARE Support Office. These reports include detailed expenditure and utilization data for inpatient care

provided for eligible beneficiaries in TRICARE Region 10. The reports were broken down into twenty-five medical categories. Care was provided for a twelve-month period; the data collection period was fifteen months. Data included were from all CHAMPUS claims processing contractors.

Average billable charges for the State of California were obtained from the State of California, Office of Statewide Health Planning and Development, Data User Support Group. Data arranged by DRG was calculated last in 1994; inflation rates from the Assistant Secretary of Defense (Health Affairs) were utilized to update the data.

The Retrospective Case Mix Analysis System (RCMAS) data base was utilized to determine the number of cases, by diagnoses, for eligible beneficiaries for FY96. The average length of stay for inpatient treatment was also extracted.

The "TRICARE California and Hawaii Program Features & Benefits" pamphlet provided the details of the three TRICARE options.

The Benefit Plan brochures for the seven nationwide managed fee-for-service plans, and the twelve health maintenance organization plans available in northern California, as listed in the "1997 FEHB Guide for Federal Civilian Employees," were obtained. The benefit plan brochure for MetraHealth Care Plan, a health maintenance organization

(HMO) available in most of California, was not obtained due to a policy of only providing benefit plan brochures to plan members.

The 1996 Customer Satisfaction Survey Results were extracted from the "1997 FEHB Guide for Federal Civilian Employees."

TRICARE customer satisfaction results are from the Military Health Services System Beneficiary Survey, conducted by the Institute for Defense Education and Analysis, formerly known as the Health Resources Study Center.

The Semi-Annual Headcount, Federal Employees Health Benefit Program was obtained from the Office of Insurance Programs, U.S. Office of Personnel Management.

E. ORGANIZATION OF THE THESIS

The thesis consists of four chapters. Chapter I covers the statement of the problem, background, literature review, and methods of analysis. Chapter II discusses CHAMPUS, TRICARE, Region 10, and FEHBP. This chapter also presents the rationale behind the desire for eligible beneficiary participation in FEHBP. Chapter III discusses the pilot study and presents analysis. Chapter IV summarizes the results, and puts forward a recommendation.

II. HEALTH CARE SYSTEMS

A. CHAMPUS

CHAMPUS covers all seven uniformed services: Navy, Marine Corps, Army, Air Force, Coast Guard, National Oceanic and Atmospheric Administration and uniformed members of the Public Health Service. Healthcare under CHAMPUS is not free to eligible beneficiaries; CHAMPUS pays up to an allowable amount for the cost of covered care received from a civilian doctor or hospital. (OCHAMPUS, 1994) CHAMPUS requires the beneficiary to attempt to receive medical care from a military facility first, if they live in designated zip codes surrounding a military treatment facility (MTF). CHAMPUS will not pay for treatment at civilian facilities if it was available at a MTF, although there is an exception for emergency care. When and where available, there is no fee for outpatient care received at a MTF, and only a small fee for inpatient care. No claims are filed for care provided by the MTF.

CHAMPUS rates, or allowable charges, are based on a nationwide average, and a Medicare-related formula (OCHAMPUS, 1994). Providers who participate in the CHAMPUS program agree to accept the allowable charge as full fee for beneficiary care. The beneficiary cost share, or the portion of the bill the beneficiary pays, is based on the allowable charge for the

procedure or service--no matter what the provider actually bills (OCHAMPUS, 1994). If a provider does not participate in CHAMPUS, the beneficiary is responsible for up to 110 percent of what the CHAMPUS allowable cost would have been for that service.

Not all procedures and services are covered under CHAMPUS; those uncovered remained the responsibility of the beneficiary, regardless of provider status. There is a cap placed on the annual out-of-pocket expense paid to cover the deductible and beneficiary cost share of allowable charges per fiscal year (01 October of one year to 30 September of the next). After this cap is reached, CHAMPUS pays the full allowable charges for covered care for the remainder of the fiscal year. (OCHAMPUS, 1994)

CHAMPUS "lacked sufficient incentives and tools to control expenditures and provide beneficiaries accessible care on an equitable basis (Backhus, 1996)." Cost overruns and other shortcomings resulted in Congress' authorization of several demonstration projects, which presented different solutions to improve non-active duty health care. In the National Defense Authorization Act for Fiscal Year 1994 (P.L. 103-160) Congress directed DoD to implement a nationwide managed care benefit program, modeled after civilian HMOs (GAO/HEHS-96-128, 1996).

B. TRICARE

TRICARE is the DoD medical program established by the Secretary of Defense under the authority of chapter 55 of Title 10, United States Code, principally section 1097. The program includes the competitive selection of contractors to financially underwrite the delivery of health care services under the Civilian Health and Medical Program of the Uniformed Services. (Congressional Record, 1996)

TRICARE is DoD's present (1997) way of meeting the medical portion of the employee benefit package in the best way possible with today's limited resources. While controlling cost, it is charged with improving access to care and preserving quality (GAO/HEHS-96-128, 1996). TRICARE was designed to incorporate some of the same cost-control features currently employed by private sector managed care programs--primary care managers, capitation budgeting and utilization management. (Backhus, 1996) The civilian contractors will act with the military medical system to provide required care. When Congress approved TRICARE, the intent was that TRICARE must not increase DoD's health care costs (Backhus, 1996).

Under TRICARE, the country has been divided into twelve regions; in each region there is a designated Lead Agent who is charged with administering the managed care support contract, overseeing and coordinating regional activities, and

implementing TRICARE within the region (Copley, 1996). Command and control of the individual facilities in the region remain with the chain of command for the parent service.

There will be seven multi-region managed care support contracts, worth about \$17 billion over five years (GAO/HEHS-96-128, 1996). The program began in March 1995 with Region 11, encompassing Washington and Oregon; by the end of 1997 TRICARE should be in place throughout the United States. Although the TRICARE program was originally mandated by law to be fully implemented by September 30, 1996, Congress extended the deadline for its implementation one year, to September 30, 1997 (Joseph, 1996).

Under current law, Medicare-eligible beneficiaries are not eligible for care under TRICARE. Retirees and dependents over the age of 65 do retain eligibility for care on a space available basis in MTFs; however, due to the initiation of TRICARE, budgetary constraints, and base closures, this availability is decreasing. (Best, 1997)

The failure to consistently provide timely access to care has been a long-time source of dissatisfaction for military beneficiaries. Primary care access standards have been established, and included in the 1994 TRICARE Policy Guidelines. DoD current standards for appointment wait times are (GAO/HEHS-96-128, 1996):

- 4 weeks for a well visit (preventive)
- 1 week for a routine visit
- 1 day for acute illness care

Under TRICARE, eligible beneficiaries select one of three health care options. The options differ according to the recipient's choice of provider, and out-of-pocket cost. As the level of patient management decreases, choice and cost (to beneficiary and government) increase. In decreasing order of choice and cost the options are: TRICARE Standard, TRICARE Extra, and TRICARE Prime.

1. TRICARE Standard

TRICARE Standard is a fee-for-service option. This option is the same as the previous medical program, CHAMPUS. Beneficiaries continue to pay the current CHAMPUS deductibles and cost shares, and abide by the CHAMPUS rules. The government pays the remainder of the CHAMPUS allowable charge. There is no enrollment fee. This is the only option available in areas distant from military treatment facilities.

2. TRICARE Extra

TRICARE Extra is a preferred provider option. Beneficiaries may choose any CHAMPUS approved healthcare provider: If the provider is part of the TRICARE contractor's Preferred Provider Network (PPN) there is a discount from the TRICARE Standard cost share. Before the cost sharing begins, however,

the annual CHAMPUS deductible must be met. There are additional CHAMPUS rules which must be followed. There is no enrollment fee.

3. TRICARE Prime

TRICARE Prime is a health maintenance organization option. Care in the MTF is augmented by the PPN. A Primary Case Manager supervises beneficiary care, and authorizes referrals for specialty care. Medical test and specialty appointments are made for the beneficiary. A fee, or copayment, is charged for each visit to a civilian provider for primary or specialty care. Nonactive-duty families (retirees and survivors up to age 65) must pay an enrollment fee.

There are five access standards (Chapman, 1996):

- Same-day access to primary care manager
- Thirty minute travel time from residence to health care facility (except in remote areas)
- Thirty minute waiting time, in office, in nonemergency situations
- Night and weekend care available for urgent health-care needs
- Emergency services in the community, available twenty-four hours a day.

NOTE: All active duty personnel are enrolled in Prime, which means they will be provided care using the HMO model, according to the access standards established in the Uniform

Benefit described in the Conference Report on H.R. 3230, National Defense Authorization Act for Fiscal year 1997.

C. TRICARE REGION 10

Northern California has been designated as TRICARE Region 10 (Golden Gate). Region 10 is somewhat unique among the twelve TRICARE regions, as it has participated in managed care initiatives since 1988, when it was a test site for the CHAMPUS Reform Initiative (CRI). Under the CRI, a contractor, (Foundation Health Federal Services, Incorporated) for the first time, developed a provider network. This program went through January 31, 1994. On February 1, 1994 Aetna Government Health Plans began providing network services. However, this contract was contested and subsequently recompeted. On March 31, 1995, the contract was awarded to QualMed, Incorporated, with services to begin March 1, 1996. This award was also contested and on April 1, 1996, Foundation Health Federal Services, Incorporated began service as the region managed care support contractor. (Regional Health Services Plan, 1996)

Region 10 has four inpatient MTFs: 60th Medical Group, Travis Air Force Base; 77th Medical Group, McClellan Air Force Base; 9th Medical Group, Beale Air Force Base; and Naval Hospital, Lemoore. The MTF at McClellan Air Force Base is scheduled to close. There are fifteen outpatient clinics in

the region. The Assistant Secretary of Defense for Health Affairs has designated the Commander, 60th Medical Group, as the Lead Agent for Region 10.

Base Realignment and Closure Committee recommendations are responsible for major demographic shifts in the region. Over the past three years, the population has decreased by 14.76%. Over five years, fiscal year (FY) 96 thru FY 2001, the tri-service active duty population is forecast to decrease 16.24%. The CHAMPUS eligible population is projected to decrease 10.04% over the same five year period. As the active duty force has been reassigned, the Region 10 patient population is aging. Additionally, the patient population is more dispersed over the region. (Regional Health Services Plan) These two changes will result in fewer beneficiaries having access to both the military treatment facilities and the contractor developed provider networks.

Table 2.1 displays the Region 10 population for FY 96, broken down by age and gender. Population forecasts for FY 96 thru FY 2001 "remain stable with only small variations (Regional Health Services Plan, 1996)" for the age groups under 45. During the same time, the 45-64 age groups shrinks each year, and the 65+ group grows each year. Projections show that in 1998, the 65+ age group will be larger than the

45-64 age group for the first time. (Regional Health Services Plan, 1996)

AGE	MALE	FEMALE
65+	39,926	37,759
45-64	41,983	43,091
35-44	14,301	16,247
25-34	15,597	16,954
18-24	17,091	15,201
15-17	5,583	5,303
5-14	19,280	18,642
0-4	9,653	9,061

Table 2.1 Region 10, Population by Age and Gender, FY 1996 (Regional Health Services Plan, 1996)

D. FEHBP

Established by the Federal Employee Health Benefits Act of 1959, Chapter 89 of Title 5, United States Code, FEHBP is administered by the United States Office of Personnel Management (OPM). As the FEHBP manager, OPM "provides qualified health plans for participation in the program, negotiates annually with carriers on benefits and premiums, manages premium payments, and publishes information concerning plan options." (Mica, 1996)

"The FEHBP system currently allows federal employees to choose from a variety of competitive health plan options to obtain the best coverage for the best price (Bush, 1992)".

The FEHBP is open to all members of Congress and their congressional staffs, the President, cabinet members, executive branch appointees, federal judges, judicial staff, and all federal civil service employees and postal service workers. Also eligible are federal retirees, survivors of deceased federal employees and retirees, dependents of active federal employees and retirees, and employees of the District of Columbia. (The Heritage Foundation, 1992) FEHBP is offered to beneficiaries living overseas, and those over age 65. Many plans offer vision and dental coverage (NMFA, January, 1995).

The FEHBP program is in fact the largest employer-sponsored health insurance system in the country. In 1996, the \$16 billion FEHBP program will insure more than 9 million federal employees, retirees, and their dependents. ...The free enterprise based program has effectively contained costs through private sector competition, with limited governmental intervention. The program is administered by fewer than 150 employees and it serves over 9 million enrollees. The FEHBP is often cited as a model of efficiency and effectiveness that the private sector and the public sector should really seek to replicate (Mica, 1996).

FEHBP premiums increased only an average of 4 percent a year from 1991-1995, compared with an average increase of 7 percent for premiums paid by medium-sized and large firms. In 1997, FEHBP premiums increased only 2.6 percent. (CBO, 1997)

Over nine million federal workers, from blue-collar workers to the President, pick and choose from a wide variety of plans--nearly 400 nationwide. There are normally two dozen

choices available in any particular city or county. (The Heritage Foundation, 1992) No federal worker can be turned down for the plan they choose, or pay more than the quoted price. Employees shop among available plans, judging price versus quality. Available plans range from traditional "fee-for-service" plans, such as Blue Cross/Blue Shield to managed care plans, such as Kaiser Permanente. Approximately 40% of all federal worker, and 18% of federal retirees, are enrolled in HMOs. (Butler et al., 1995)

The government makes a direct payment calculated by the "Big Six" formula. Under this arrangement, the government contributes a fixed dollar amount equal to 60% of the average premiums for individual and family coverage of the six largest health benefit plans in the program. Further, the government contribution cannot exceed 75% of the total premium. (The Heritage Foundation, 1992) The difference between premium cost and the government contribution is paid by the employee, through a payroll deduction. In 1996, the government financed about 71 percent of the cost of the FEHBP premium; plan participants contributed the remaining 29 percent (Mica, 1996).

Each fall a four-week period known as "open season" is scheduled, during which time an employee can switch health benefit plans. Numerous aids are available to help choose a

plan. The OPM issues every employee an unbiased description of each plan's cost and benefits. "Health fairs" are held by agencies, to distribute information about the various plans. (The Heritage Foundation, 1992) Along with efforts on the government's part to educate, companies and employee organizations market plans through brochures and advertising. Individuals discuss plans with their physicians, human resource office personnel, and coworkers. Upon examining all resources, federal employees have the tools available to make an informed decision.

E. COMPARISON OF TRICARE AND FEHBP

Associations representing active duty families and retirees have sought consideration for access to the FEHBP as an option to TRICARE (Joseph, 1996). Military beneficiaries are the only federal employees or retirees not now allowed to participate in the FEHBP. Furthermore, military retirees are the only federal retirees who must change health care plans at age 65.

Below are listed potential comparisons between the TRICARE program and FEHBP:

- Choice: during Open Season, FEHBP beneficiaries may change to any other participating plan located in the geographical area. TRICARE beneficiaries may enroll in TRICARE Prime for one-year periods.

-FEHBP Coverage is available regardless of where the beneficiary lives. Family members who do not accompany their sponsors to duty stations do not have to worry about the availability of health care.

-There are seven FEHBP national plans providing different benefit packages available; additionally, a subset of the approximately 400 local plans is available in each geographic location. TRICARE offers one traditional fee-for-service plan, one preferred provider plan, and one HMO plan.

-FEHBP is available to federal retirees regardless of age. (NMFA, March 1995)

-Medicare does not provide coverage outside of the United States (OCHAMPUS, 1994), while FEHBP does.

-Medicare does not cover prescription drugs, while all plans under the FEHBP provide this coverage.

-Supplemental insurance, which is recommended under some TRICARE options, can exclude for pre-existing conditions. FEHBP does not allow exclusion for pre-existing conditions. (NMFA, July 1995)

-Catastrophic caps place a limit on out-of-pocket allowable expenses. Under TRICARE, the active duty cap is \$1000 annually, and the retirees' and survivors' caps are \$3000 for Prime and \$7500 for the other options. On the

other hand, depending on the FEHBP plan, out-of-pocket expenses vary from approximately \$1500 to \$3750 (NMFA, July 1995).

III. ANALYSIS

A. ASSUMPTIONS

Average California private insurance rates, by Diagnostic Related Group (DRG), are used to determine cost share under FEHBP national fee-for-service plans. It is assumed they represent reasonable and customary/allowable billing charges.

The average length of hospital stay, obtained from RCMAS, is used in daily/per admission CHAMPUS calculations.

There are two policy categories under FEHBP: Self and Self and Family. It is assumed that an active duty member with one dependent will be permitted to purchase an individual policy, Self coverage, for that single dependent. A Self and Family policy would be required when there is more than one dependent, and is hereafter referred to as a Family policy.

When a choice is available, the worst-case scenario (for the beneficiary) is analyzed. The one exception is the Blue Cross and Blue Shield (BC/BS) benefit plan which makes a distinction between member hospitals (less expensive) and non-member hospitals (more expensive). Both cases have been considered. Some plans differentiate between Self only and Family when assigning catastrophic cap rates. The greater of the two amounts is used in the analysis.

B. PRELIMINARY COST-DEMAND ANALYSIS

1. Overview

Random fluctuations in the patient population demand rate results in changes in yearly costs paid by DoD to the civilian healthcare sector. In FY 95 there were 7719 admissions of eligible beneficiaries to civilian healthcare facilities covered by CHAMPUS in Region 10, and 7573 such admissions in FY 96. Without further years' data to reveal a possible trend, the above admission counts are consistent with year-to-year independent Poisson variability with mean about 7646.

Total cost (government and patient portion) for civilian inpatient care amounted to \$47,898,672 FY 95 and \$40,248,274 in FY 96. The overall average cost per admission in FY 95 was \$6205.29 and \$5314.71 in FY 96. When admissions and costs for a fiscal year are considered together, a clearer cost picture emerges. In Figures 3.1 and 3.2 the relative proportions of the number of admissions to the total cost for care are shown. It may be seen that the graphs are highly correlated with respect to the frequency of the categories of care. The greatest volume of care consistently occurred in the categories of Obstetrics and Other (which includes newborns), while the greatest overall cost represents care in Cardiology. These effects are consequences of the age and family status of policy holders.

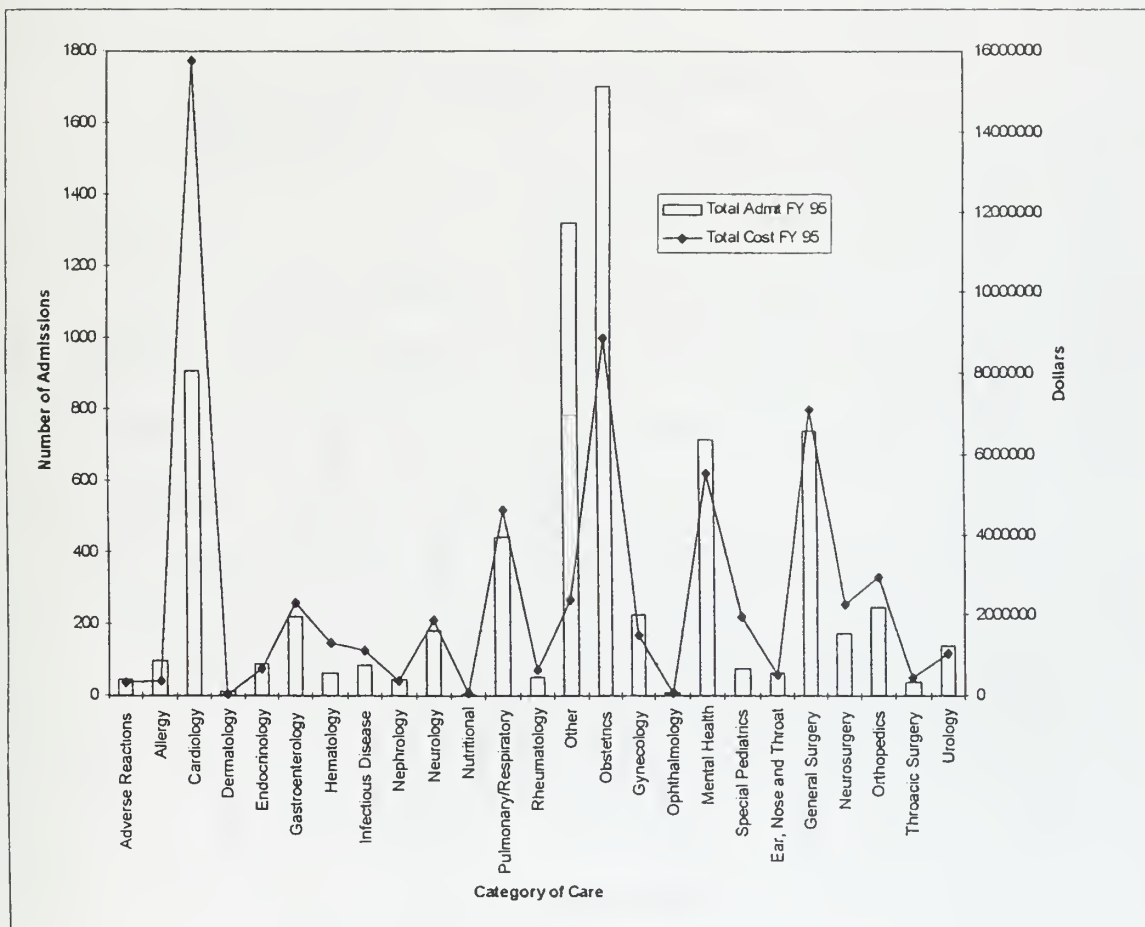


Figure 3.1. Number of Admissions Contrasted With Total Cost of Care, by Major Category, for FY 95

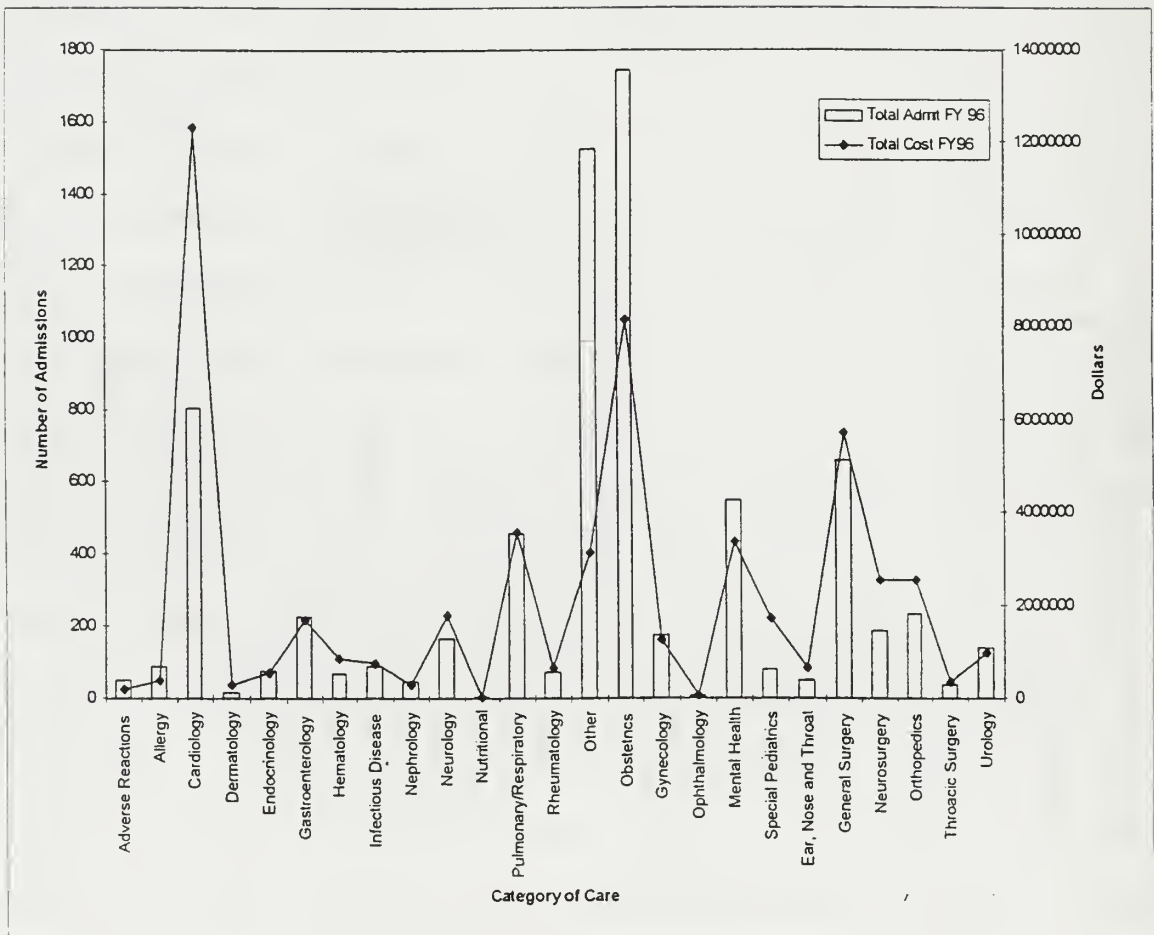


Figure 3.2. Number of Admissions Contrasted With Total Cost of Care, by Major Category, for FY 96

A slightly different picture emerges when the number of admissions is plotted alongside the average total (government and patient) cost per admission, as shown in Figures 3.3 and 3.4. Again, Cardiology emerges as a cost leader. Two other areas, Hematology and Special Pediatrics, are costly on a per-admission basis.

2. Analysis of Current Cost Sharing

The current distribution of CHAMPUS costs between the government and the eligible beneficiary have been identified. In FY 95, the government portion of the cost of care was \$44,730,857, while patient out-of-pocket contributions totaled \$3,167,815. In FY 96, the government cost was \$37,813,413 while the patient cost was \$2,434,861.

The CHAMPUS-eligible population decreased from 216,721 in FY 95 to 195,248 in FY 96, or 90.09 percent of the FY 95 population. Using this same percentage, a credible rough estimate for FY 96 of both government and patient cost can be made using the FY 95 data. The government cost estimate is \$40,298,029, versus the actual of \$37,813,413. The patient cost estimate is \$2,853,884, while the actual cost was \$2,434,861.

Figure 3.5 quantifies the disparity between the government cost and the patient's out-of-pocket cost. With one exception, the government is responsible for approximately

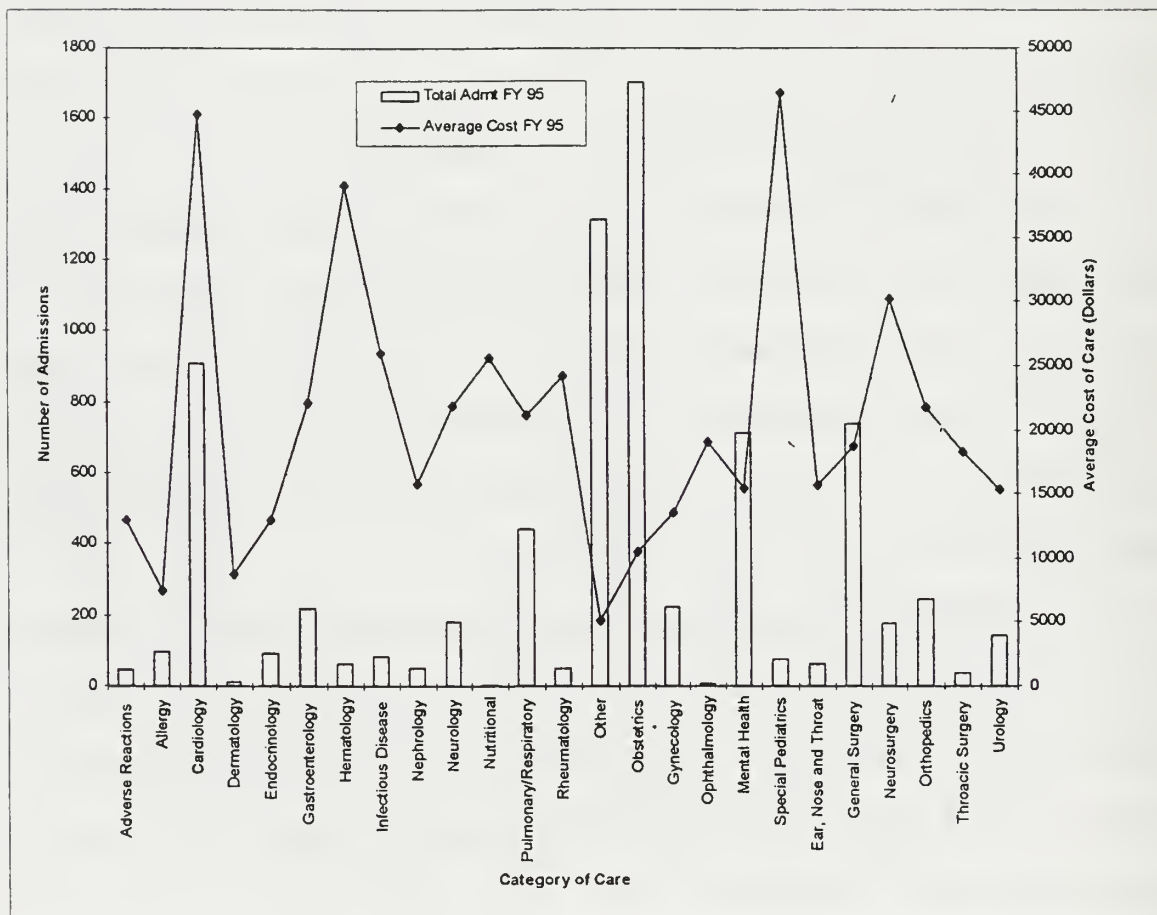


Figure 3.3. Number of Admissions Contrasted With Average Cost of Care, by Major Category, for FY 95

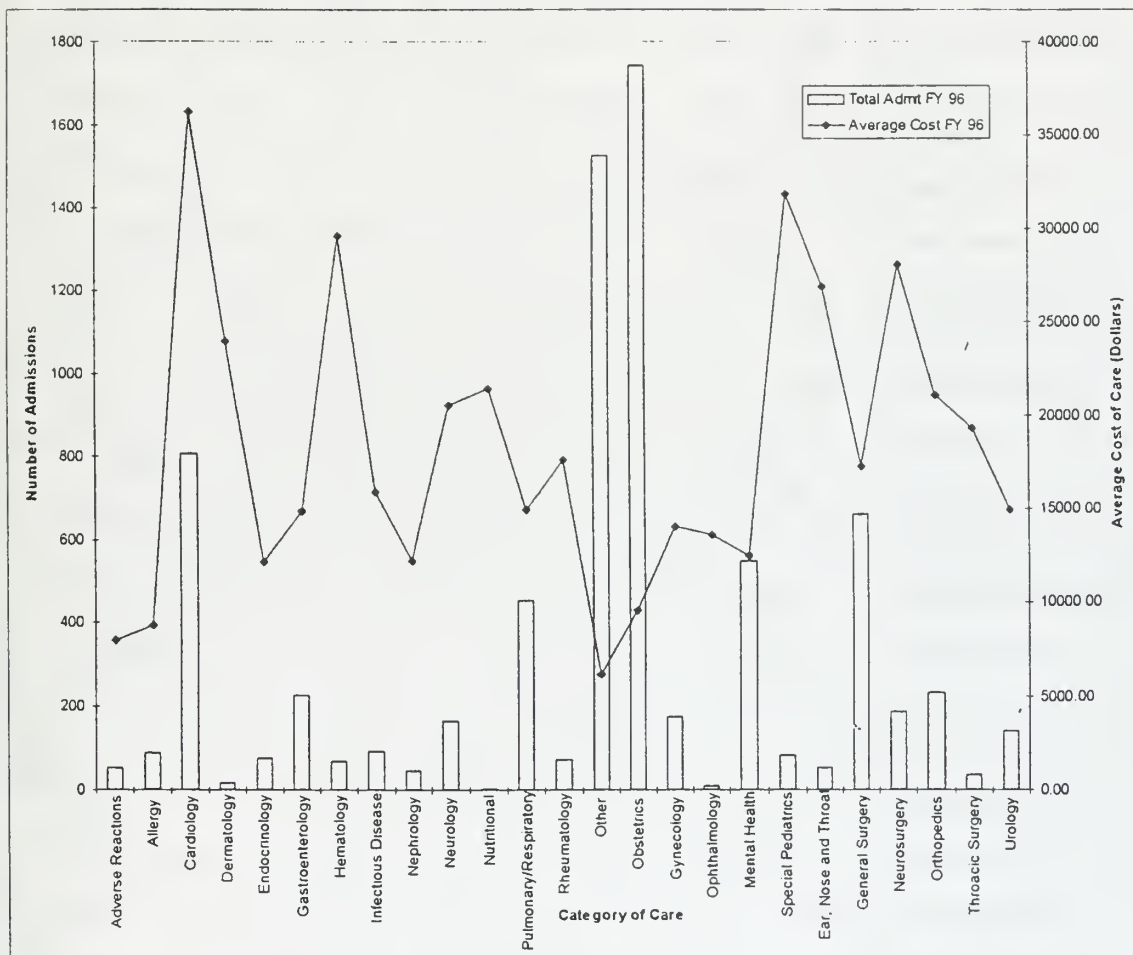


Figure 3.4. Number of Admissions Contrasted With Average Cost of Care, by Major Category, for FY 96

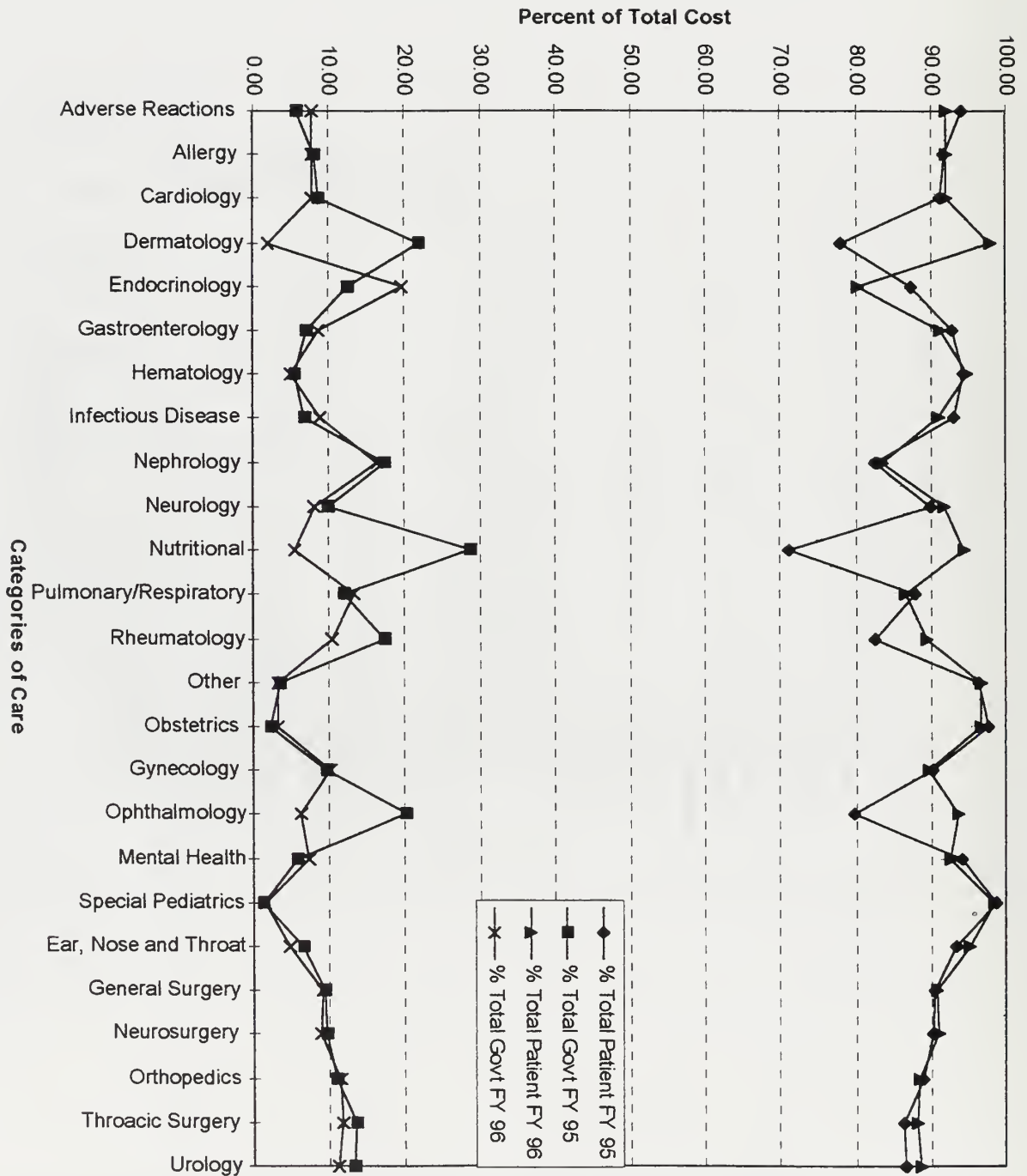


Figure 3.5. Comparison of Government and Patient Costs, by Percent, by Major Category, for FY 95 and FY 96

85 percent or greater of the total cost of inpatient care. Figure 3.6 depicts the difference between the average government and patient costs per admission under TRICARE. It can be noted that the government bears the greatest portion of the expense for each admission; the patient cost is minimal in comparison. The averages are computed by dividing the government or patient costs by the number of admissions.

C. THE FEHBP OPTION

Under FEHBP, the government cost share is dependent on the number of single and family participants. The cost to the government is fixed, dependent on the number of enrollees. The independent cost variable is the eligible beneficiaries' out-of-pocket cost. Several components make up the total cost of a health benefit plan, including: annual premium, annual deductible, per admission deductible, catastrophic cap and coinsurance (the percentage of covered charges the enrollee must pay after applicable deductibles have been met). These costs are described in each plan's FEHBP brochure, and may be used by the potential enrollee to determine which available plan best meets individual needs.

1. Traditional Fee-for-Service Plans

There are seven nationwide fee-for-service plans available to all federal employees. They are: Alliance Health Benefit Plan, APWU Health Plan (APWU stands for the

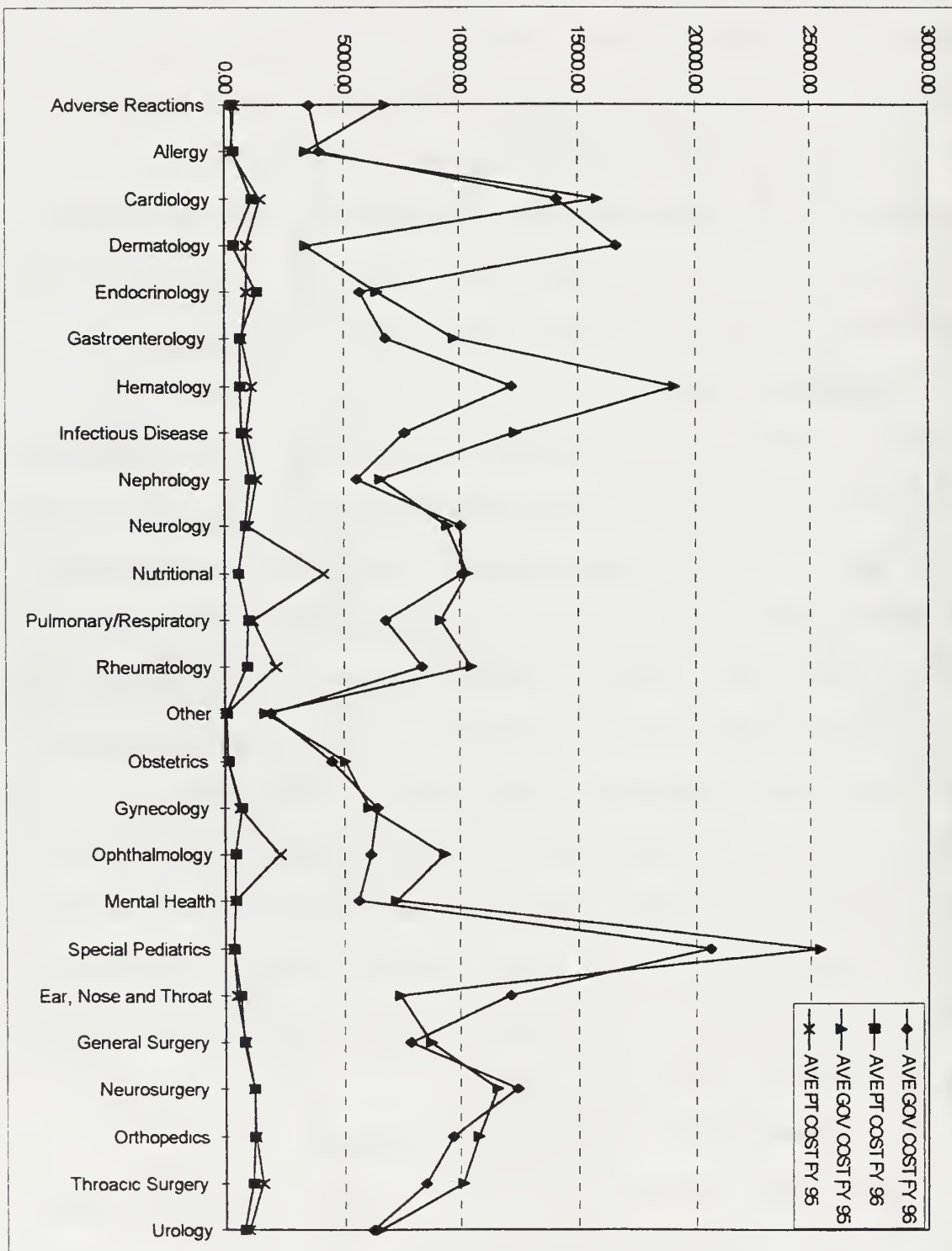


Figure 3.6. Comparison of Average Government and Patient Costs Per Admission, by Major Category, for FY 95 and FY 96

American Postal Workers Union), Blue Cross and Blue Shield Service Benefit Plan (BC/BS), Government Employees Hospital Association, Inc. Benefit Plan (GEHA), Mail Handlers Benefit Plan, NALC Health Benefit Plan (NALC stands for National Association of Letter Carriers), and Postmasters Benefit Plan. (Seven additional plans are only open to specific groups, such as the Rural Carrier Benefit Plan and the Secret Service Benefit Plan.) Overall participation figures may be found in Table 3.1.

	TOTAL	Self	Family
Alliance	9,002	6,327	2,675
APWU	118,716	50,521	68,195
BC/BS High	96,928	77,828	19,100
BC/BS Standard	1,657,612	740,395	917,217
GEHA	247,240	80,904	166,336
Mail Handlers High	448,755	136,774	311,981
Mail Handlers Standard	38,970	17,612	21,358
NALC	172,989	57,806	115,183
Postmasters High	3,943	2,577	1,366
Postmasters Standard	11,459	6,102	5,357

Table 3.1. Nationwide Enrollees, FEHBP Fee-for-Service Benefit Plans. As of September, 1996. (OPM, September 1996)

a. Coinsurance and Per-Admission Deductibles

Benefit plan specifics regarding coinsurance and per-admission deductibles are tabulated in Table 3.2. For example, the cost to the patient is \$400 for an admission with

reasonable and customary charges totaling \$1000, a per admission deductible of \$250 and coinsurance of 20%. The \$400 is a result of the \$250 deductible, and 20% of the remaining \$750.

	Per Admission Deductible	Coinsurance, Room and Board	Coinsurance, Other Charges
Alliance	250	30%	30%
APWU	0	0	20%
BC/BS High	100	30%	30%
BC/BS Standard	250	30%	30%
GEHA	0	0	20%
Mail Handlers High	175	0	0
Mail Handlers Standard	250	0	0
NALC	100	0	20%
Postmasters High	150	0	15%
Postmasters Standard	600	30%	30%

Table 3.2. Per Admission Deductibles and Coinsurance Levels, FEHBP Fee-for-Service Plans. Calendar Year 1997, Per-Admission Deductible in Dollars, Coinsurance in Percent Out-of-Pocket

b. Catastrophic Cap Limits

Protection against catastrophic costs is included in all FEHBP benefit plans. Normally, the benefit plan will pay 100% of the reasonable and customary/allowable charges for the remainder of the calendar year once out-of-pocket expenses exceed the plan's catastrophic cap. Although there is some variation among plans, the following expenses are usually counted toward the cap limit: Calendar year deductible, per

admission inpatient deductible, and the percent cost share of hospital, surgical, maternity and other medical benefits. Not normally included towards the catastrophic cap are expenses for: mail order prescription drugs; non-compliance with the benefit plan's requirements; mental conditions and substance abuse; and those in excess of reasonable and customary charges or maximum benefit limitations. Catastrophic cap limits may be found in Table 3.3.

BENEFIT PLAN	Self	Family
Alliance	3,000	3,000
APWU	3,000	3,500
BC/BS High	2,700	2,700
BC/BS Standard	3,750	3,750
GEHA	2,500	3,000
Mail Handlers High	2,000	2,000
Mail Handlers Standard	3,000	3,000
NALC	1,750	3,000
Postmasters High	2,500	2,500
Postmasters Standard	6,700	6,700

Table 3.3. Catastrophic Protection, FEHBP Fee-for-Service Benefit Plans. For Calendar Year 1997, in Dollars

c. Comparison by DRG

Per-admission deductibles, coinsurance rates, and catastrophic cap limits can be used to estimate inpatient expenses. A category for comparison purposes is by Diagnostic Related Group, or DRG. DRGs consist of approximately 500

categories of diagnosis, within which related diagnosis are grouped together. (There is a weight, which accounts for resource intensity and diagnosis severity, associated with each DRG. This weight is assigned by the Health Care Financing Administration, and is published annually in the Federal Registrar prior to the beginning of each fiscal year.) A DRG is coded as a three-digit number, linked to a description. For example, 001 corresponds to "Craniotomy age > 17 except for trauma", 083 is "Major chest trauma w (with) cc (complications or comorbidity)", 084 is "Major chest trauma w/o (without) cc (complications or comorbidity)" and 391 is "Normal newborn".

The fifty most common DRGs for Region 10, for FY 96, have been identified, and are listed in Appendix A. Using per-admission deductibles, coinsurance rates, and catastrophic cap limits, along with California average charges per admission by DRG, the policy holding unit's out-of-pocket expense inpatient episode are estimated. This expense is dependent on DRG, not on Self or Family status. This has been done for each of the seven FEHBP fee-for-service plans. In each case, the same benefit plan has the lowest expense, which is a result of a low per-admission deductible and 100% coverage. The other descriptive statistics vary by DRG. Tabulated summary statistics are located in Appendix B.

d. *Comparison with TRICARE Standard*

Out-of-pocket expenses for non-active duty dependents under TRICARE Standard were calculated for the same FY 96 top fifty DRGs. The computation methodology is shown in Table 3.4. For active duty family members, TRICARE Standard provides the lowest out-of-pocket cost in every case. For retirees and others, the estimated TRICARE cost is below the FEHBP median of the population of plans considered in most instances. TRICARE Standard is more expensive for retirees, their dependents and survivors than the FEHBP plan with the lowest expense. Figure 3.7 compares estimated TRICARE Standard costs to the FEHBP estimated costs.

Active Duty Family Members	The Greater of: - \$9.70 per day - \$25.00 minimum charge per admission
Retirees and Others	The Lesser of: - \$323.00 per day - 25% of billed charges

Table 3.4. Computation of Inpatient Charges Under TRICARE Standard

2. *Health Maintenance Organization Plans*

In 1997, there are approximately 600 FEHBP HMO benefit plans from which to choose, however, each is available only in a specific location--perhaps an entire state, or surrounding

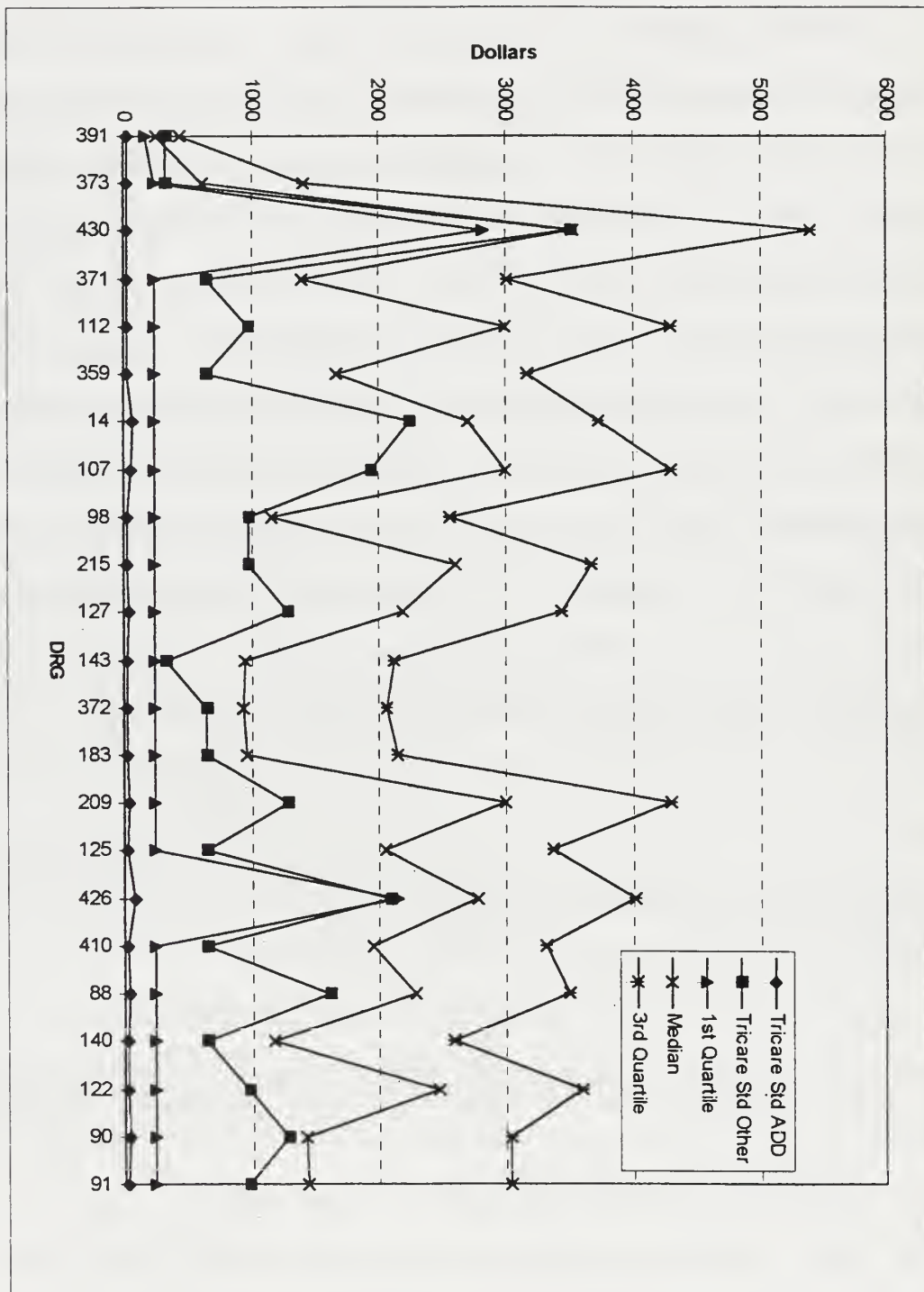


Figure 3.7. Comparison of TRICARE Standard and FEHBP Top 50 DRGs (part 1 of 2)

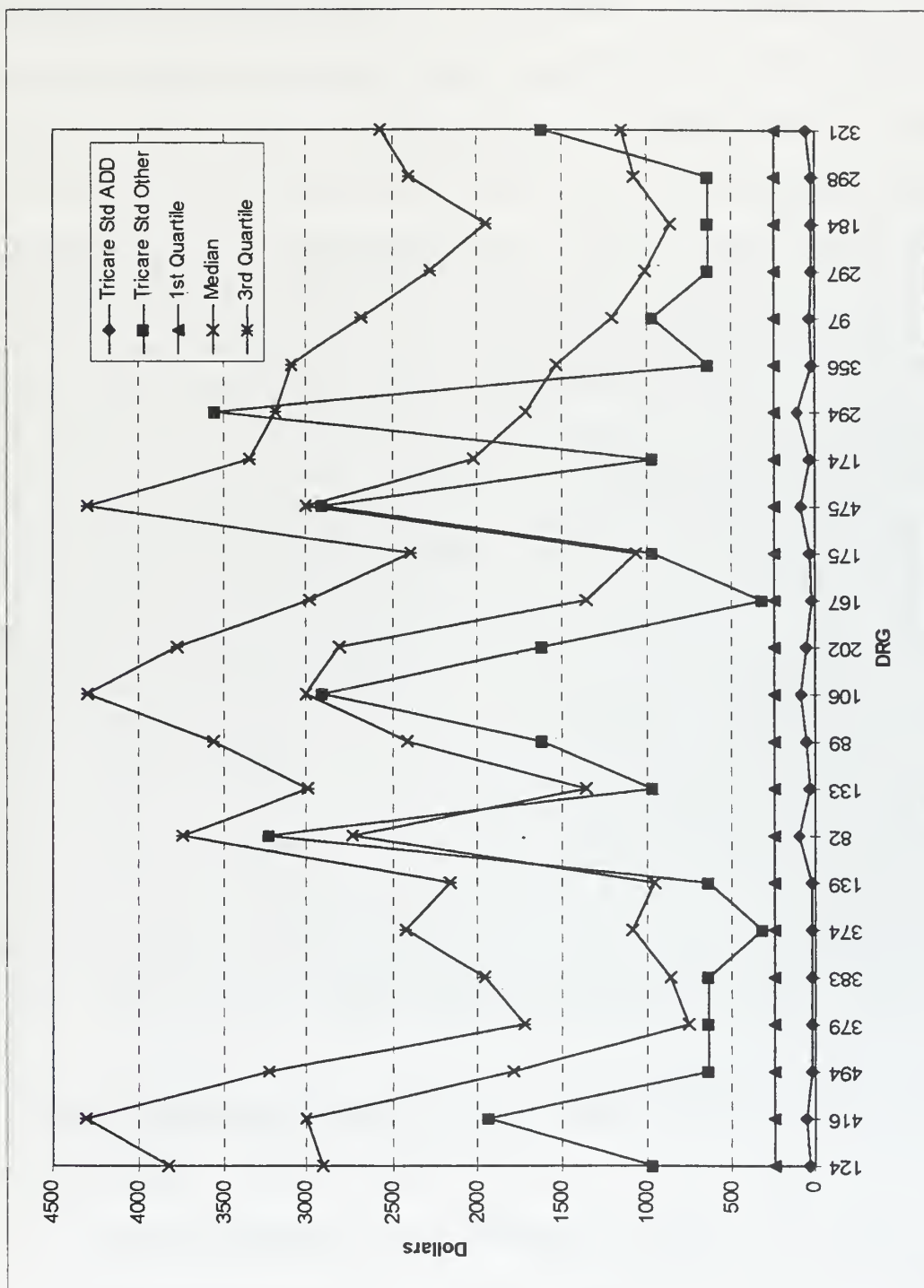


Figure 3.7. (part 2 of 2)

a metropolitan area. Nineteen HMOs are available in the state of California; only those enrolling participants in Northern California are considered in this analysis. The plans, and numbers of enrollees (as of September 1996) may be found in Table 3.5.

	TOTAL	Self	Family
Aetna HPs of California Inc.	1,971	834	1,137
Blue Shield of CA Access+HMO	2,210	841	1,369
CaliforniaCare	13,202	4,321	8,881
CIGNA HealthCare of CA	2,372	1,085	1,287
FHP Health Care	12,927	7,223	5,704
Foundation Health	5,292	2,674	2,618
Health Net	23,602	8,936	14,666
Kaiser Permanente	81,516	34,842	46,674
Maxicare Northern California	666	229	437
MetraHealth Care Plan	318	89	229
National HMO Health Plan	292	99	193
Omni Healthcare	1,542	597	945
PacifiCare CA	8,826	3,286	5,540

Table 3.5. Total Enrollees, FEHBP HMO Benefit Plans. As of September, 1996. (OPM, September 1996)

a. Coinsurance and Per-Admission Deductibles

There are no coinsurance or per-admission deductibles for any of the FEHBP HMO health benefit plans. Inpatient care is delivered free of charge to the enrollee in

all but one of the plans. The one plan includes a per day copayment with a maximum cost of \$100.00 per admission.

b. Catastrophic Cap Limits

The calendar year catastrophic cap limits for FEHBP HMO's, for both Self and Family enrollees, are found in Table 3.6. There is some variation among plans regarding exclusions, but normally not included under the cap are expenses for prescription drugs and dental care.

	Self	Family
Aetna HPs of California Inc.	1,000	2,000
Blue Shield of CA Access+HMO	1,000	2,000
CaliforniaCare	1,000	3,000
CIGNA HealthCare of CA	1,000	3,000
FHP Health Care	1,000	2,000
Foundation Health	1,000	2,500
Health Net	1,500	4,500
Kaiser Permanente	1,500	3,000
Maxicare Northern California	1,000	2,000
National HMO Health Plan	3,475	8,641
Omni Healthcare	750	1,500
PacifiCare CA	800	2,400

Table 3.6. Catastrophic Protection, FEHBP HMO Benefit Plans. For Calendar Year 1997, in Dollars

c. Comparison with TRICARE Prime

Out-of-pocket expenses for non-active duty dependents under TRICARE Prime were calculated using the

formula of Table 3.7. This methodology is based on the number of days hospitalized; for this comparison it is assumed that the average length of stay per DRG is the same whether the benefits are received through TRICARE Prime or FEHBP HMO. Out-of-pocket expenses for inpatient care under TRICARE Prime are greater than those for all but one of the HMO plans.

Active Duty Family Members Retirees and Others	The Greater of: - \$11.00 per day - \$25.00 minimum charge per admission
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Table 3.7. Computation of Inpatient Charges Under TRICARE Prime

d. Access to Care/Quality of Care

Data for analysis regarding access to care and quality of care comes from the 1996 Customer Satisfaction Survey, conducted in June, July and August 1996 by the Gallup Organization. A random sample of enrollees in the FEHBP were given an opportunity to rate their health plans. In plans with low response rates, enrollees were contacted by telephone, and provided the opportunity to answer the survey questions. All plans were surveyed with the following exceptions--there were too few members, the plan did not participate in the FEHBP the previous year, the plan did not provide information enabling enrollees to be reached, or, even after telephone follow-up, there were not enough survey

respondents. Results were adjusted for age, educational level, state of health, and other characteristics; generally, there was not much difference between the adjusted and unadjusted responses. The error range of overall satisfaction is less than 7% at 95% level of confidence. (OPM, November 1996)

The survey asked participants to rate aspects of their plans on a five point scale: poor, fair, good, very good, and excellent. Results for respondents in the top three categories (good, very good, and excellent) were tabulated. Results of poor and fair responses were not available. A subset of questions and responses are shown in Table 3.8.

The first question deals with access to care, specifically, arranging and receiving care. The mean was 85.67, with a standard deviation of 3.75. The next questions related to the quality of care received from physicians and other medical professionals (mean 84.92, standard deviation 3.18); enrollee satisfaction with the physicians available through the plan's coverage, (mean 80.25, standard deviation 3.89); the thoroughness and competence of the plan's physicians and other medical personnel (mean 88.75, standard deviation 2.49); the results of care, or how much the enrollee felt they were helped (mean 84.25, standard deviation 3.77); the explanation the enrollee received regarding what was wrong, what was being done, and what to expect (mean 83.42,

	Access to Care	Quality of Care	Providers Available	Thoroughness and Competence	Results of Care	Explanation of Care	Choice of Specialists	Choice of Primary Care Doctors	Ability to See the Same Provider	OVERALL SATISFACTION
Aetna HPs of California Inc.	86	83	84	89	85	85	75	85	86	83
Blue Shield of CA Access+HMO	81	81	76	84	77	78	69	77	85	75
CaliforniaCare	85	83	80	89	83	82	68	79	88	84
CIGNA HealthCare of CA	84	83	80	90	83	83	70	79	84	80
FHP Health Care	84	83	84	87	82	83	72	82	89	85
Foundation Health	81	82	73	87	80	82	66	76	86	72
Health Net	80	83	76	87	82	83	63	77	86	83
Kaiser Permanente	90	91	83	91	90	88	74	86	87	91
Maxicare Northern California	90	87	84	88	88	84	67	86	94	77
National HMO Health Plan	90	89	80	92	87	84	79	84	90	83
Omni Healthcare	88	86	78	88	86	82	70	82	88	79
PacifiCare CA	89	88	85	93	88	87	74	84	90	85

Table 3.8. Excerpts from 1996 Customer Satisfaction Survey. Percentage of Respondents Answering Good, Very Good, or Excellent. From OPM, November 1996

standard deviation 2.57); the choice of specialists (mean 70.58, standard deviation 4.44); the choice of primary care providers (mean 81.42, standard deviation 3.68); and finally, continuity of care, or the ability to see the same provider on most visits (mean 87.75, standard deviation 2.73). (OPM, November 1996)

The last question was "All things considered, how satisfied are you with your current health plan (OPM, November 1996)." Unlike the previous questions, this was rated on a six-point scale: somewhat satisfied, very satisfied, extremely satisfied, somewhat dissatisfied, very dissatisfied, and

extremely dissatisfied. Of those responding positively, (somewhat satisfied, very satisfied, extremely satisfied) the mean was 81.42, with a standard deviation of 5.12. Negative results were unavailable. (OPM, November 1996)

The Institute for Defense Education and Analysis, in response to a requirement from the Office of the Assistant Secretary of Defense (Health Affairs), has regularly conducted the Military Health Services System Beneficiary Survey. Survey 6 was conducted from April to June 1996, during which time eligible beneficiaries received survey forms in the mail. A choice of methods of response was offered--mail or telephone. Results to the question "Overall, how satisfied are you with the ... health care services you may have received during the past six months" are as follows: did not use, 47.7 percent; very dissatisfied, 1.5 percent; dissatisfied, 2.7 percent; neither, 2.5 percent; satisfied, 15.5 percent; very satisfied, 10.9 percent. Approximately 80 percent of those who received services responded satisfied or very satisfied.

Another way to look at access and quality is to look at those who are dissatisfied, and as a result change plans. Blankenau found that over a ten-year period, the percentage of federal employees who change health benefit plans is quite low.

Although the available evidence is anecdotal, FEHBP HMO enrollees seem satisfied with access to care, and the quality of care received. Access to specialists did appear to be a matter of concern to survey respondents. It is not known if this response was due to unfamiliarity with the increased management style of HMOs (for example, seeing specialists only when referred by the primary provider), or if access to specialists truly was limited. When questioned regarding the results of care received, however, the response was overwhelmingly positive. (OPM, November 1996)

3. Cost to the Government

If non-active duty beneficiaries were to receive care under any member plan of the FEHBP, the cost to the government would be the government share of the benefit plan premium. (DoD's position is that it is less costly to the government for non-active duty beneficiaries to obtain healthcare under the TRICARE program than to underwrite an alternative such as FEHBP.) Table 3.9 shows the current enrollee and the government portions of benefit plan premiums for 1997. The current FEHBP is administered at OPM by approximately 150 personnel. Addition of non-active duty beneficiaries may result in an increased administrative staff. The data used to estimate the government cost was provided by OCHAMPUS

	Self Enrollee	Self Government	Family Enrollees	Family Government
Aetna HPs of California Inc.	654.48	1633.56	1626.84	3508.44
Blue Shield of CA Access+HMO	434.76	1304.16	1078.56	3235.68
CaliforniaCare	423.60	1271.04	1080.84	3242.76
CIGNA HealthCare of CA	540.60	1622.04	1160.28	3480.96
FHP Health Care	438.12	1314.24	1134.12	3402.36
Foundation Health	498.72	1496.04	1692.36	3508.44
Health Net	486.72	1460.16	1143.12	3429.24
Kaiser Permanente	645.96	1397.76	1112.16	3336.48
Maxicare Northern California	483.36	1450.32	1075.44	3226.56
National HMO Health Plan	450.72	1352.16	1118.76	3356.40
Omni Healthcare	486.00	1458.00	1381.92	3508.44
PacifiCare CA	416.40	1249.20	1077.84	3233.52

Table 3.9. Current FEHBP Premiums in Dollars

(Appendix C). Four cases were examined. Each case was calculated for Self enrollees and for Family enrollees.

1. The current cost-share protocol was examined. The government share of the premiums was averaged across FEHBP HMO plans to estimate the government's expense.
2. The 75 percent cap on the government share of the premium currently in place was removed. This modification to current policy was applied to the remainder of the cases.
3. The "Big Six" percentage was increased to 75 percent.

4. The government share was set at the average of the total premium, for all participating HMOs in the region. This resembles the process used to calculate the active duty Variable Housing Allowance.

The number of admissions versus the number of beneficiaries allowed estimation of the expected number of repeat admissions. Using the average cost for the category and the government share of the premium, the costs by category were recalculated. If the average cost of a category was above the government premium, then the government "saved money" on each admission. The readmission cases identify "saved money" as the premium has already been recouped on the first admission. The total savings results from the average cost savings and the readmissions savings. Results can be found in Table 3.10 and the complete worksheet in Appendix D.

	Case I	Case II	Case III	Case IV
Self Enrollee savings	\$30,591,040.	\$29,119,432.	\$26,340,069.	\$27,307,174.
Family Enrollees savings	\$17,271,625.	\$16,345,057.	\$10,373,122.	\$8,939,326.
Zero Out-of-pocket cost	Number of plans (of 12) Self: 0 Family: 0	Number of plans (of 12) Self: 0 Family: 0	Number of plans (of 12) Self: 10 Family: 4	Number of plans (of 12) Self: 6 Family: 8

Table 3.10. Projected Government Saving Utilizing Four Different Premium Calculation Methods

D. HEALTH CARE DEMANDS AND COST PROBABILITY MODEL

The four cases presented above provide an upper limit to the government expense of providing inpatient care to eligible beneficiaries in Region 10. Limitations of the available data required several assumptions be made, assumptions which may not be plausible. The Health Care Demands and Cost Probability Model negates the need for the assumptions that only one member per policy holding unit is admitted per year, and that no one is admitted under more than one category of care.

The Health Care Demands and Cost Probability Model will predict the average cost, over one year, for any FEHBP plan under consideration, and may be calculated using Equation (1). The derivation of Equation (1) may be found in Appendix E.

$$C(t) = S(t) P_S + F(t) P_F + \sum_d s_d(t) V_S(d) + \sum_d f_d(t) V_F(d) \quad (1)$$

The total cost in year t is represented by $C(t)$. $S(t)$ and $F(t)$ represent the number of Self and the number of Family policy holders in year t . P_S and P_F are the fixed yearly premium cost for Self policy holders and Family policy holders. The total demand of care for DRG d , in year t , by all Self policy holders is represented by $s_d(t)$; the same demand of care by all Family policy holders is represented by

$f_d(t)$. The final two terms, $V_S(d,t)$ and $V_F(d,t)$, refer to the average cost per visit/episode of care for DRG d in year t .

IV. SUMMARY AND RECOMMENDATIONS

This pilot study explores an FEHBP option to restructuring the present military beneficiary health system. There are several advantages to beneficiaries in allowing non-active duty beneficiaries to enroll in FEHBP. FEHBP is available regardless of location and age of the enrollee, and permits choice through the ability to change benefit plans annually during Open Season. Disadvantages include the fact that TRICARE is currently in place, and would have to be dismantled.

Congress mandated that any changes to the system meet three requirements: access to care be increased, quality of care be maintained while out-of-pocket costs are not increased. Two methods of health care delivery have been examined: traditional fee-for-service plans, and health maintenance organizations. Additionally, fiscal constraints dictate that any changes not result in increased government expense.

The FEHBP fee-for-service plans do increase access to care, as the enrollee is free to choose healthcare providers--primary care physicians and specialists. The enrollees have no restrictions on when and how often they seek the services of a healthcare provider, although they must pay each time.

The question of whether the desired provider is part of a plan or network is not an issue.

Out-of-pocket expenses for inpatient care have been shown to be significantly higher for active duty family members under the traditional fee-for-service plans offered by FEHBP when compared to TRICARE Standard (see Figure 3.7). Expenses for retirees and others, under most FEHBP plans, will also be higher than under TRICARE Standard. The goal mandated by Congress has only been partially met.

With all HMOs, care is arranged through, and provided for, by the company offering the benefit plan. Increased patient management effectively restricts enrollee choice; however, the potential availability of multiple HMOs in an area restores that choice. Current FEHBP HMO enrollees appear satisfied with the level of access provided and the quality of care. FEHBP HMO options offer reduced out-of-pocket inpatient expense to the enrollees when compared to TRICARE Prime. FEHBP HMOs meet the requirements stated by Congress.

Four alternative medical allotment cases have been examined in this thesis. First, the current FEHBP cost share protocol was examined. Second, the 75 percent cap on the government share of the premium currently in place was removed. Third, the "Big 6" percentage was increased from 60 to 75 percent. Finally, the government share was set at the

average of the total premium, for all participating HMOs in the region.

Cases I and II provide the greatest savings to the government, but have the highest out-of-pocket expense to the enrollees. Cases III and IV, although cost savings to the government are slightly decreased, are favorable to the enrollees. (See Table 4.1)

	Case I	Case II	Case III	Case IV
Mean	482	265	31	73
Minimum	416	32	0	0
Maximum	654	654	246	389

Table 4.1. Summary of Out-of-Pocket Expenses by Case, in Dollars

The actual savings to the government will fall somewhere between the Self and Family totals listed, as the Region 10 population is a combination of the two groupings. Additional savings occur if several members of one family receive inpatient care, as the entire family (regardless of the number of members) is covered by the payment of one Family premium. Although this pilot study did not examine outpatient care, the government incurs no additional cost for beneficiaries who have been hospitalized, resulting in further cost savings to the government.

A preliminary Health Care Demands and Cost Probability Model has been developed to predict the average and

statistical distribution of cost, over one year, for any FEHBP plan under consideration. Although designed to model inpatient care, it can easily be extended to predict outpatient demands and costs. The model, and its extensions, can be used as a basis for better understanding the range of costs that might well occur in a future year. It is a potential *cost risk assessment tool*: it requires further enhancement.

The principal contribution of this thesis is to show how historical military beneficiary medical data can be used to compare costs of service provision, by TRICARE versus by FEHBP plans. The numbers obtained are limited, but the method can be used when more complete and authoritative data becomes available.

The conclusion of this thesis is that allowing non-active duty military beneficiaries to participate in the HMO option of the FEHBP has the potential to reduce out-of-pocket cost for enrollees, and maintain or improve access to and quality of care. To realize the potential benefits described above, Case III or IV will have to be implemented. This will require legislative action.

Costs to the government for inpatient care would be reduced under each of the four Cases explored. To determine if this savings is sufficient to adequately subsidize those

beneficiaries not admitted to hospitals, further study will be required.

APPENDIX A. MOST FREQUENT DRGS IN TRICARE REGION 10, FY 96,
TOTAL AND BROKEN INTO BENEFICIARY CATEGORIES

DRG	DESCRIPTION	TOTAL NUMBER	Active Duty Dependent	Retiree	Survivor	Retiree Dependent
391	Normal newborn	1243	1167			76
373	Vaginal delivery w/o complicating diagnoses	1113	1005		7	101
430	Psychoses	380	125	36	32	187
371	Cesarean Section w/o cc	252	220			32
112	Amputation for circ system disorders except upper limb & toe	185		127	17	41
630	Neonate, birthwt >2499g, w/o signif or proc, w other prob	142	132			10
359	Uterine & adnexa proc for non-malignancy w/o cc	117	39		5	73
14	Specific cerebrovascular disorders except TIA	102		52	18	32
107	Coronary bypass w/o cardiac cath	96		75		21
98	Bronchitis & asthma age 0-17	86	73			13
215	Back & neck procedures w/o cc	86	13	40	4	29
127	Heart failure & shock	82		47	8	27
143	Chest Pain	80	8	27	6	39
372	Vaginal delivery w complicating diagnoses	77	77			
183	Esophagitis, gastroent & misc digest disorders age >17 w/o cc	75	15	18	8	34
209	Major joint & limb reattachment procedures of lower extremity	69		26	9	34
125	Circulatory disorders except AMI, w card cath w/o complex diag	61	7	30		24
426	Depressive neuroses	60	39			21
410	Chemotherapy w/o acute leukemia as secondary diagnosis	58		19	5	34
88	Chronic obstructive pulmonary disease	57		20	8	29
140	Angina Pectoris	55		26	7	22
122	Circulatory disorders w AMI w/o C.V. comp disch alive	54		50	4	
901	Alc/drug abuse or depend, detox or oth sympt treat age >21 w/o cc	53	16	24	3	10
90	Simple pneumonia & pleurisy age >17 w/o cc	51	9	21	6	15
91	Simple pneumonia & pleurisy age 0-17	51	41			10

DRG	DESCRIPTION	TOTAL NUMBER	Active Duty Dependent	Retiree	Survivor	Retiree Dependent
124	Circulatory disorders except AMI, w card ath & complex diag	51		31	5	15
416	Septicemia age >17	49		18	9	22
494	Laparoscopic cholecystectomy w/o C.D.E. w/o cc	48	15	9	4	20
628	Neonate, birthwt >2499g, w/o signif or proc, w minor prob	48	48			
379	Threatened abortion	46	46			
383	Other antepartum diagnoses w medical complications	45	45			
374	Vaginal delivery w sterilization &/or D&C	43	43			
139	Cardiac arrhythmia & conduction disorders w/o cc	40		23		17
82	Respiratory neoplasms	36		13	4	19
133	Artherosclerosis w/o cc	36		20	5	11
89	Simple pneumonia & pleurisy age >17 w cc	34		14	7	13
106	Coronary bypass w cardiac cath	34		34		
202	Cirrhosis & alcoholic hepatitis	34		21		13
167	Appendectomy w/o complicated principal diag w/o cc	31	19			12
627	Neonate, birthwt >2499g, w/o signif or proc, w major prob	31	31			
175	G.I. hemorrhage w/o cc	29		13	4	12
475	Respiratory system diagnosis with ventilator support	29		14	4	11
174	G.I hemorrhage w cc	28		10	3	15
294	Diabetes age >35	28		11	6	11
356	Female reproductive system reconstructive procedures	28			4	24
97	Bronchitis & asthma age >17 w/o cc	27	10			17
297	Nutritional & misc metabolic disorders age >17 w/o cc	25		11	3	11
184	Esophagitis, gastroent & misc digest disorders age 0-17	24	24			
298	Nutritional & misc metabolic disorders age 0-17	24	24			
321	Kidney & urinary tract infections age >17 w/o cc	22	7		5	10

APPENDIX B. SUMMARY STATISTICS OF COSTS, FEHBP FEE-FOR-SERVICE PLANS, FOR THE 50 MOST FREQUENTLY OCCURRING DRGS IN TRICARE REGION 10, FY 96

DRG	391	373	430	371	112	369	14	107	98	215	127
Mean	323	784	4078	1573	3468	1813	2886	5575	1341	2807	2252
1st Quartile	172	250	2828	250	250	250	250	250	250	250	250
Median	257	612	3522	1393	3000	1677	2717	3000	1154	2613	2194
3rd Quartile	446	1409	5407	3014	4300	3166	3723	4300	2570	3667	3443
Standard Deviation	198	584	1866	1278	3431	1483	2318	8003	1076	2231	1888
Sample Variance	39143	340980	3439880	1632366	11772555	220152	5373390	6404391	1158265	4978660	3564655
Range	670	1632	5782	3306	9626	3913	6143	22167	2794	5919	5022
Minimum	100	100	1500	100	100	100	100	100	100	100	100
Maximum	770	1732	7282	3406	9626	4013	6243	22267	2894	6019	5122
DRG	372	183	209	125	426	410	88	140	122	90	91
Mean	1104	1141	3639	2134	2996	2063	2342	1366	2500	1608	1620
1st Quartile	250	250	250	250	2162	250	250	250	250	250	250
Median	924	999	3000	2066	2787	1960	2301	1170	2487	1436	1449
3rd Quartile	2075	2152	4300	3389	4019	3318	3600	2803	3600	3036	3044
Standard Deviation	866	888	3769	1777	1086	1701	1974	1080	2127	1307	1317
Sample Variance	749556	807122	1408142	315786	1200690	2894992	3897911	1188459	4524846	1707282	1733708
Range	2299	2376	10551	4725	3106	4520	5250	2826	5648	3396	3425
Minimum	100	100	100	100	1350	100	100	100	100	100	100
Maximum	2399	2476	10551	4825	4456	4620	5350	2926	5749	3496	3625

DRG	416	494	379	383	374	139	82	133	89	106	202
Mean	3150	1905	935	1048	1273	1144	2716	1545	2442	6650	2778
1st Quartile	250	250	250	250	250	250	250	250	250	250	250
Median	3000	1785	759	889	1088	952	2741	1351	2419	3000	2814
3rd Quartile	4312	3224	1722	1958	2428	2158	3735	2399	3653	4300	3775
Standard Deviation	2782	1555	716	816	1016	901	2339	1255	2071	10319	2400
Sample Variance	7738153	2449732	512979	668970	1031546	811900	5468887	1574913	4288914	105491336	5758335
Range	7396	4144	1946	2182	2652	2382	6194	3235	5503	28254	6351
Minimum	100	100	100	100	100	100	100	100	100	100	100
Maximum	7496	4244	2046	2282	2752	2482	6294	3335	5803	28354	6451

DRG	175	475	174	294	355	97	297	184	298	321
Mean	1254	5219	2100	1844	1688	1385	1199	1040	1251	1343
1st Quartile	250	250	250	250	250	250	250	250	250	250
Median	1070	3000	2015	1713	1529	1207	1016	852	1076	1155
3rd Quartile	2380	4300	3347	3185	3087	2683	2274	1943	2403	2574
Standard Deviation	999	7198	1745	1511	1374	1124	950	810	1005	1078
Sample Variance	998759	51807973	3043788	2282214	1888378	1254076	903024	655733	1010047	1162314
Range	2613	20030	4638	3991	3897	2907	2488	2157	2527	2758
Minimum	100	100	100	100	100	100	100	100	100	100
Maximum	2713	20130	4738	4091	3897	3007	2588	2257	2727	2888

APPENDIX C. CHAMPUS COST DATA, MAJOR CATEGORIES OF CARE, FY
96

	TOTAL USERS	Active Duty Dependents	Retirees	Dependents of Retirees, Survivors	Total Admissions	Total Government Cost	Total Patient Cost	Total Cost	Average Government Cost	Average Patient Cost	Average Total Cost
Adverse Reactions	53	23	8	22	53	150,745	9,456	160,201	2844	178	3023
Allergy	77	41	8	28	90	328,789	25,967	354,756	3653	289	3942
Cardiology	619	48	341	230	807	9,028,971	455,114	9,484,085	11,188	564	11752
Dermatology	18	4	3	11	18	287,961	4,461	292,422	15,998	248	16246
Endocrinology	70	12	22	36	76	364,744	83,835	448,579	4800	1103	5902
Gastroenterology	194	51	58	85	228	1,457,858	79,091	1,536,949	6394	347	6741
Hematology	57	17	16	24	68	720,613	28,516	749,129	10,598	419	11017
Infectious Disease	87	31	19	37	92	651,981	72,924	724,905	7087	793	7879
Nephrology	43	17	7	19	47	185,396	20,513	205,909	3944	436	4381
Neurology	147	42	33	72	164	1,419,128	95,386	1,514,514	8653	582	9235
Nutritional	3	1	0	2	3	25,948	1,034	26,982	8649	345	8994
Pulmonary/Respiratory	400	115	127	158	455	2,656,099	366,445	3,022,544	5838	805	6643
Rheumatology	71	5	27	39	72	457,209	30,387	487,596	6350	422	6772
Other (Includes Newborns)	1,505	1,381	14	112	1,529	2,687,488	44,805	2,732,273	1757	29	1787
Obstetrics	1,641	1,494	2	145	1,743	3,164,642	79,994	3,244,636	1815	46	1862
Gynecology	167	62	0	105	176	697,814	49,911	747,725	3965	284	4248
Ophthalmology	10	5	2	3	9	27,305	670	27,975	3034	74	3108
Mental Health	425	193	47	187	549	2,866,234	216,524	3,082,758	5221	394	5615
Special Pediatrics	77	70	2	5	82	1,296,794	8,776	1,305,570	15,815	107	15922
Ear, Nose and Throat	49	26	14	9	52	545,995	11,408	557,403	10,500	219	10719
General Surgery	554	121	177	257	660	4,328,557	354,858	4,683,415	6558	538	7096
Neurosurgery	164	25	72	67	186	1,955,729	141,413	2,097,142	10,514	760	11275
Orthopedics	212	61	52	99	234	1,662,394	180,103	1,842,497	7104	770	7874
Thoracic Surgery	35	4	15	16	37	244,417	24,385	268,802	6606	659	7265
Urology	135	30	58	47	143	600,622	48,885	649,507	4200	342	4542
TOTAL	6813	3879	1124	1815	7,573	37,813,413	2,434,861	40,248,274	4994	322	5315

APPENDIX D. COMPUTATION OF GOVERNMENT SHARE OF PREMIUM FOR
FEHBP HMOS

	single total premium	single, government 60 % of "Big 6" with 75 % cap, Case I	single, government 60 % of "Big 6" with no cap, Case II	single, government 75 % of "Big 6" with no cap, Case III	single, government upto average of premiums, Case IV	single, enrollee 60 % of "Big 6" with 75 % cap, Case I	single, enrollee 60 % of "Big 6" with no cap, Case II	single, enrollee 75 % of "Big 6" with no cap, Case III	single, enrollee upto average of premiums, Case IV
Aetna HPs of California Inc.	2288.04	1633.56	1633.56	2041.95	1899.01	654.48	654.48	246.09	389.03
Blue Shield of CA Access+HMO	1738.92	1304.16	1633.56	1738.92	1738.92	434.76	105.36	0.00	0.00
CaliforniaCare	1694.64	1271.04	1633.56	1694.64	1694.64	423.60	61.08	0.00	0.00
CIGNA HealthCare of CA	2162.64	1622.04	1633.56	2041.95	1899.01	540.60	529.08	120.69	263.63
FHP Health Care	1752.36	1314.24	1633.56	1752.36	1752.36	438.12	118.80	0.00	0.00
Foundation Health	1994.76	1496.04	1633.56	1994.76	1899.01	498.72	361.20	0.00	95.75
Health Net	1946.88	1460.16	1633.56	1946.88	1899.01	486.72	313.32	0.00	47.87
Kaiser Permanente	1863.72	1397.76	1633.56	1863.72	1863.72	465.96	230.16	0.00	0.00
Maxicare Northern California	1933.68	1450.32	1633.56	1933.68	1899.01	483.36	300.12	0.00	34.67
National HMO Health Plan	1802.88	1352.16	1633.56	1802.88	1802.88	450.72	169.32	0.00	0.00
Omni Healthcare	1944.00	1458.00	1633.56	1944.00	1899.01	486.00	310.44	0.00	44.99
PacificCare CA	1665.60	1249.20	1633.56	1665.60	1665.60	416.40	32.04	0.00	0

	family total premium	family, government 60 % of "Big 6" with 75 % cap, Case I	family, government 60 % of "Big 6" with no cap, Case II	family, government 75 % of "Big 6" with no cap, Case III	family, government upto average of premiums, Case IV	family, enrollee 60 % of "Big 6" with 75 % cap. Case I	family, enrollee 60 % of "Big 6" with no cap, Case II	family, enrollee 75 % of "Big 6" with no cap, Case III	family, enrollee upto average of premiums, Case IV
Aetna HPS of California Inc.	5135.28	3508.44	3508.44	4385.55	4595.96	1626.84	1626.84	749.73	539.32
Blue Shield of CA Access+HMO	4314.24	3235.68	3235.68	4314.24	4314.24	1078.56	805.80	0.00	0.00
CaliforniaCare	4323.60	3242.76	3242.70	4323.60	4323.60	1080.84	815.16	0.00	0.00
CIGNA HealthCare of CA	4641.24	3480.96	3480.93	4385.55	4595.96	1160.28	1132.80	255.69	45.28
FHP Health Care	4536.48	3402.36	3402.36	4385.55	4536.48	1134.12	1028.04	150.93	0.00
Foundation Health	5200.80	3508.44	3508.44	4385.55	4595.96	1692.36	1692.36	815.25	604.84
Health Net	4572.36	3429.24	3429.27	4385.55	4572.36	1143.12	1063.92	186.81	0.00
Kaiser Permanente	4448.64	3336.48	3336.48	4385.55	4448.64	1112.16	940.20	63.09	0.00
Maxicare Northern California	4302.00	3226.56	3226.50	4302.00	4302.00	1075.44	793.56	0.00	0.00
National HMO Health Plan	4475.16	3356.40	3356.37	4385.55	4475.16	1118.76	966.72	89.61	0.00
Omni Healthcare	4890.36	3508.44	3508.44	4385.55	4595.96	1381.92	1381.92	504.81	294.40
PacificCare CA	4311.36	3233.52	3233.52	4311.36	4311.36	1077.84	802.92	0.00	0.00

	number of beneficiaries	number of admissions	number of repeat admissions	average cost for category	single beneficiary category savings per admission Case 1	single beneficiary category savings per admission Case 2	single beneficiary category savings per admission Case 3	single beneficiary category savings per admission Case 4
Adverse Reactions	53	53	0	3023	1695	1389	981.05	1123
Allergy	77	90	13	3942	2524	2308	1900.05	2042
Cardiology	619	807	188	11752	10334	10118	9710.05	9852
Dermatology	18	18	0	16246	14828	14612	14204.05	14346
Endocrinology	70	76	6	5902	4484	4268	3860.05	4002
Gastroenterology	194	228	34	6741	5323	5107	4699.05	4841
Hematology	57	68	11	11017	9599	9383	8975.05	9117
Infectious Disease	87	92	5	7879	6461	6245	5837.05	5979
Nephrology	43	47	4	4381	2963	2747	2339.05	2481
Neurology	147	164	17	9235	7817	7601	7193.05	7335
Nutritional	3	3	0	8994	7576	7360	6952.05	7094
Pulmonary/Respiratory	400	455	55	6643	5225	5009	4601.05	4743
Rheumatology	71	72	1	6772	5354	5138	4730.05	4872
Other (Includes Newborns)	1505	1529	24	1787	369	153	-254.95	-113
Obstetrics	1641	1743	102	1862	444	228	-179.95	-38
Gynecology	167	176	9	4248	2830	2614	2206.05	2348
Ophthalmology	10	9	0	3108	1690	1474	1066.05	1208
Mental Health	425	549	124	5615	4197	3981	3573.05	3715
Special Pediatrics	77	82	5	15922	14504	14288	13880.05	14022
Ear, Nose and Throat	49	52	3	10719	9301	9085	8677.05	8819
General Surgery	554	660	106	7096	5678	5462	5054.05	5196
Neurosurgery	164	186	22	11275	9857	9641	9233.05	9375
Orthopedics	212	234	22	7874	6456	6240	5832.05	5974
Thoracic Surgery	35	37	2	7265	5847	5631	5223.05	5365
Urology	135	143	8	4542	3124	2908	2500.05	2642

	family beneficiaries category savings per admission Case I	family beneficiaries category savings per admission Case II	family beneficiaries category savings per admission Case III	family beneficiaries category savings per admission Case IV	savings due to multiple admissions	single beneficiary Total savings by category, Case I	single beneficiary Total savings by category, Case II	single beneficiary Total savings by category, Case III	single beneficiary Total savings by category, Case IV
Adverse Reactions	-350	-486	-1362.55	-1573	0	85065	73617	51995.65	59519
Allergy	569	433	-443.55	-654	51246	245594	228962	197549.9	208480
Cardiology	8379	8243	7366.45	7156	2209376	8606122	8472418	8219897	8307764
Dermatology	12873	12737	11860.45	11650	0	266904	263016	255672.9	258228
Endocrinology	2529	2393	1516.45	1306	35412	349292	334172	305615.5	315552
Gastroenterology	3368	3232	2355.45	2145	229194	1261856	1219952	1140810	1168348
Hematology	7644	7508	6631.45	6421	121187	668330	656018	632764.9	640856
Infectious Disease	4506	4370	3493.45	3283	39395	601502	582710	547218.4	559568
Nephrology	1008	872	-4.55	-215	17524	144933	135645	118103.2	124207
Neurology	5862	5726	4849.45	4639	156995	1306094	1274342	1214373	1235240
Nutritional	5621	5485	4608.45	4398	0	22728	22080	20856.15	21282
Pulmonary/Respiratory	3270	3134	2257.45	2047	365365	2455365	2368965	2205785	2262565
Rheumatology	3399	3263	2386.45	2176	6772	386906	371570	342605.6	352684
Other (Includes Newborns)	-1586	-1722	-2598.55	-2809	42888	598233	273153	-340812	-127177
Obstetrics	-1511	-1647	-2523.55	-2734	189924	918528	564072	-105374	127566
Gynecology	875	739	-137.55	-348	38232	510842	474770	406642.4	430348
Ophthalmology	-265	-401	-1277.55	-1488	0	16900	14740	10660.5	12080
Mental Health	2242	2106	1229.45	1019	696260	2479985	2388185	2214806	2275135
Special Pediatrics	12549	12413	11536.45	11326	79610	1196418	1179786	1148374	1159304
Ear, Nose and Throat	7346	7210	6333.45	6123	32157	487906	477322	457332.5	464288
General Surgery	3723	3587	2710.45	2500	752176	3897788	3778124	3552120	3630760
Neurosurgery	7902	7766	6889.45	6679	248050	1864598	1829174	1762270	1785550
Orthopedics	4501	4365	3488.45	3278	173228	1541900	1496108	1409623	1439716
Thoracic Surgery	3892	3756	2879.45	2669	14530	219175	211615	197336.8	202305
Urology	1169	1033	156.45	-54	36336	458076	428916	373842.8	393006

	family beneficiaries Total savings by category, Case I	family beneficiaries Total savings by category, Case II	family beneficiaries Total savings by category, Case III	family beneficiaries Total savings by category, Case IV
Adverse Reactions	-18550	-25758	-72215.2	-83369
Allergy	95059	84587	17092.65	888
Cardiology	7395977	7311793	6769209	6638940
Dermatology	231714	229266	213488.1	209700
Endocrinology	212442	202922	141563.5	126832
Gastroenterology	882586	856202	686151.3	645324
Hematology	556895	549143	499179.7	487184
Infectious Disease	431417	419585	343325.2	325016
Nephrology	60868	55020	17328.35	8279
Neurology	1018709	998717	869864.2	838928
Nutritional	16863	16455	13825.35	13194
Pulmonary/Respiratory	1673365	1618965	1268345	1184165
Rheumatology	248101	238445	176210	161268
Other (Includes Newborns)	-2344042	-2548722	-3867930	-4184657
Obsterics	-2289627	-2512803	-3951222	-4296570
Gynecology	184357	161645	15261.15	-19884
Ophthalmology	-2650	-4010	-12775.5	-14880
Mental Health	1649110	1591310	1218776	1129335
Special Pediatrics	1045883	1035411	967916.7	951712
Ear, Nose and Throat	392111	385447	342496.1	332184
General Surgery	2814718	2739374	2253765	2137176
Neurosurgery	1543978	1521674	1377920	1343406
Orthopedics	1127440	1098608	912779.4	868164
Thoracic Surgery	150750	145990	115310.8	107945
Urology	194151	175791	57456.75	29046

APPENDIX E. DERIVATION OF HEALTH CARE DEMANDS AND COST PROBABILITY MODEL

1. Let

$s_{id}(t)$ = the number of DRG-type d demands made by i^{th}

Self policy holder in year t

$f_{id}(t)$ = the number of DRG-type d demands made by i^{th}

Family policy holder in year t

$s_d(t) = \sum_{i=1}^{S(t)} s_{id}(t)$ = total of DRG-type d demands made by all

Self policy holders in year t

$S(t)$ = number of Self policy holders in year t

$f_d(t) = \sum_{i=1}^{F(t)} f_{id}(t)$ = total of DRG-type d demands made by all

Family policy holders in year t

$F(t)$ = number of Family policy holders in year t

2. To derive the total cost associated with any single FEHBP benefit plan, it is necessary to add the fixed annual cost, or premium, to the variable cost, which is the cost of the individual episodes of care of demand d . Let

P_s = annual premium cost for the Self policy holder

P_F = annual premium cost for the Family policy holder

$V_s(d)$ = cost of episode of care of demand d , Self policy holder

$V_F(d)$ = cost of episode of care of demand d , Family policy holder

Therefore, for a particular FEHBP benefit plan, the total cost for year t can be represented as:

$$C(t) = S(t)P_S + F(t)P_F + \sum_d s_d(t)V_S(d) + \sum_d f_d(t)V_F(d) \quad (E-1)$$

3. Health Care Demands and Cost Probability Model

Assume $s_{id}(t)$ is modeled by $\hat{s}_{id}(t)$, a random variable that is Poisson with mean $\mu_{id}(t)$, and $f_{id}(t)$ is modeled by

$\hat{f}_{id}(t)$, a random variable that is Poisson with mean $\beta_{id}(t)$. Every individual enrollee, or policy holding unit, i.e. the i^{th} , is characterized by a set of independent Poisson processes that characterize its demand for service across DRG types. This model ignores possible dependency between different DRG demand types within an enrollee unit, for example, the i^{th} family which may be "large", whereas the $I+1^{\text{st}}$ family may be small. The differences between families are accounted for. If family I has a large number of demands of type d , this does not influence the occurrence of demands of type k in the same family unit.

This model calculates the random total cost, for year t , by:

$$\hat{C}(t) = \hat{S}(t)P_S + \hat{F}(t)P_F + \sum_d \hat{s}_d(t)V_S(d) + \sum_d \hat{f}_d(t)V_F(d) \quad (E-2)$$

As Equation E-2 is linear, expectations (mean values) can be taken directly. $\hat{S}(t)$ and $\hat{F}(t)$ are also potentially random as are the characteristics of individual Self and Family units, put here these are taken as given (conditioned on).

Taking the conditional expectation:

$$E[\hat{C}(t) | \hat{S}(t)=S(t), \hat{F}(t)=F(t)] = S(t)P_S + F(t)P_F + \sum_d E[\hat{S}_d(t)] V_S(d) + \sum_d E[\hat{f}_d(t)] V_F(d) \quad (E-3)$$

$$= S(t)P_S + F(t)P_F + \sum_d V_S(d) \sum_i \alpha_{id}(t) + \sum_d V_F(d) \sum_i \beta_{id}(t) \quad (E-4)$$

By the Poisson assumption:

$$\hat{s}_d(t) = \sum_i \hat{s}_{id}(t) \text{ is Poisson with mean } \sum_{i=1}^{S(t)} \alpha_{id}(t) \equiv \alpha_d(t)$$

$$\hat{f}_d(t) = \sum_i \hat{f}_{id}(t) \text{ is Poisson with mean } \sum_{i=1}^{F(t)} \beta_{id}(t) \equiv \beta_d(t)$$

The maximum likelihood estimate (m.l.e.) of $\alpha_{id}(t)$ is $s_{id}(t)$, and the m.l.e. for the total demand rate in year t given $S(t)$ is $s_d(t)$ for the DRG type d . In the case of the Family enrollee, the m.l.e. for the total demand rate during year t of $\beta_{id}(t)$ is $f_d(t)$, given $F(t)$. Therefore, the m.l.e. of the average cost of a particular FEHBP benefit plan, in year t , is actually given by Equation E-1, for this particularly simple model. It must be noted that the rates $\alpha_{id}(t)$ and $\beta_{id}(t)$ are conditional on the characteristics

of the i^{th} enrollee, such as the enrollee's ages, sexes, etc.

Using the Poisson assumption, given $S(t)$ and $F(t)$ and the conditioning on the properties of the i^{th} enrollee, it is possible to calculate measures of variability of the demand process.

First, the point estimate of $E[\hat{C}(t)|\hat{S}(t) = S(t), \hat{F}(t) = F(t)]$ is Equation E-1, as given data $s_d(t)$, $f_d(t)$ is approximately

the m.l.e. of $\alpha_d(t) = \sum_i \alpha_{id}(t)$, and $\beta_d(t) = \sum_i \beta_{id}(t)$.

Secondly, the variance can be calculated as follows, using Poisson properties:

$$\hat{Var}[\hat{C}(t)|S(t), F(t)] = 0 + \sum_d s_d(t)(V_s(d))^2 + \sum_d f_d(t)(V_F(d))^2 \quad (\text{E-5})$$

Lastly, the standard error of the cost estimate is the square root of the variance, Equation E-5:

$$SEC \equiv SE[\hat{C}(t)|S(t), F(t)] = \sqrt{\sum_d s_d(t)(V_s(d))^2 + \sum_d f_d(t)(V_F(d))^2} \quad (\text{E-6})$$

The Health Care Demands and Cost Model allows for the comparison of costs of different FEHBP benefit plans. The model does not, however, allow the making of inferences for random future groups, that is, it ignores the variability attributed to different parts of the country, or to different time spans if the group compositions change (appreciably).

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